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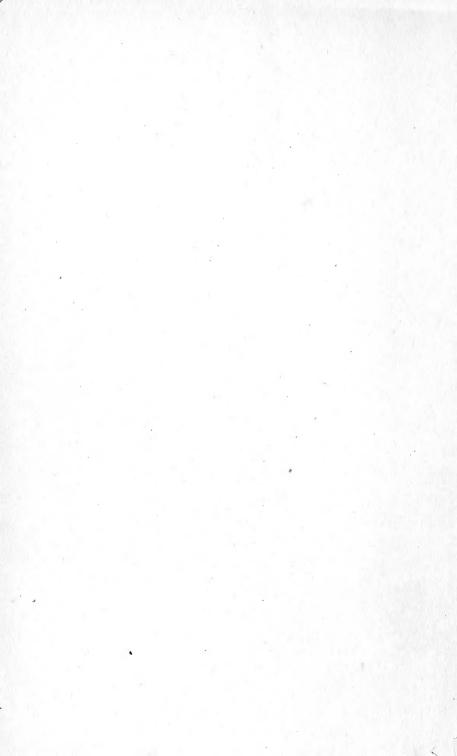
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FLORA

of /

TROPICAL AFRICA.

EDITED BY

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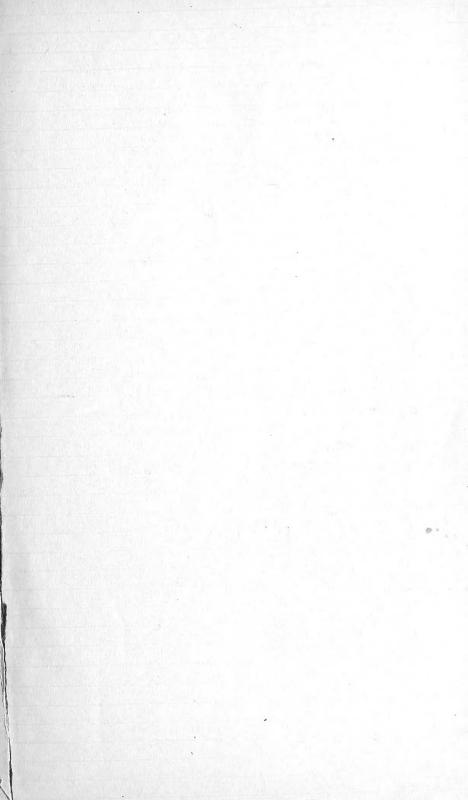


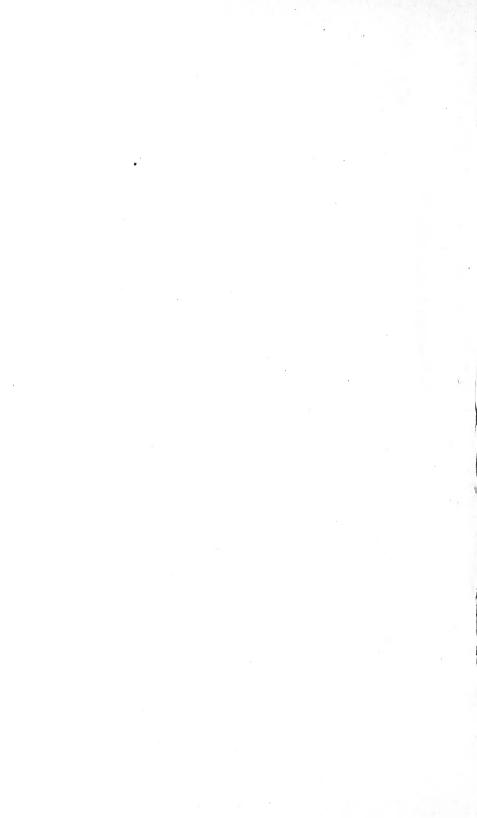
Descred france 24, 1919 (Kew Bull 1932: 208)

LONDON:

L. REEVE & CO. LIMITED,
6 HENRIETTA STREET, GOVENT GARDEN.
1919. SEE FOTT for Pt. 4 1920
A. S. H. AUG 9 1919







2- or 3-noded and simple below the lowest flowering branch, terete or the lowest internodes more or less compressed, glabrous. Leafsheaths terete or those of the innovations compressed and keeled. produced at the mouth into firm lanceolate to subulate acute auricles up to 10 lin, long, glabrous, smooth, the basal more or less persistent: ligules scarious, truncate, glabrous, adnate to the auricles of the sheath; blades narrowly linear from a gradually attenuated base, tapering to a long fine point, up to 1 (sometimes almost 13) ft. by 1-2 lin., folded or those of the culm-leaves flat, firm, pale to glaucous green, glabrous, rarely hairy, particularly towards the base, rough upwards on the face and along the margins. Inflorescence, if not reduced to a single raceme-pair, with all the internodes much elongated, the lowest up to over \frac{1}{2} ft. long; simple flowering branches and the rays of the 2-3-rayed tiers erect, slender; lowest subtending leaf of robust specimens resembling the preceding leaf, the following with spathaceous sheaths and much reduced blades, always glabrous. Spatheoles narrow, acute to finely acuminate, 3-5 in. long. subherbaceous to almost scarious, early and tightly inrolled; peduncles strict, ultimately long-exserted from the spatheole, glabrous, scaberulous upwards and disarticulating at the slightly widened tips. Racemes about 1 in. long, greenish, mostly tinged with purple or violet, glabrous (except the upper pedicels), the upper with a bare filiform glabrous scaberulous base, 7-13 lin, long: both bases with upwards widened obliquely truncate tips; the very short joints glabrous or with a few rufous cilia; pedicels up to 3½ lin. long, cilia rufous. Fertile spikelet about 7 lin. long, including the callus, pale or greenish, the beak darker, at length more or less brown; callus 2 lin. long, beard dense, short, silky, fulvous to rufous. Lower glume densely pubescent at the base, loosely so or glabrescent to glabrous upwards, 9-nerved, nerves very slender when seen from the inner side, but widened into obtuse more or less distinct ribs on the back, the 3 intracarinal of the beak prominent and scabrid like the keels; upper glume obtuse or deltoid-truncate, pubescent or glabrous. Lower floret: valve oblong, obtuse, 6-7 lin. long, faintly 2-3-nerved. Upper floret \(\): valve linear, oblong, cartilaginous from a narrowed hyaline base, 3½ lin, long with narrow hyaline margins and linear-lanceolate densely ciliate lobes, not much over $\frac{1}{2}$ lin. long; awn stout, $2\frac{1}{2}$ in long, fulvous, column longer than the bristle, fulvously hirtellous; valvule obovate, long-ciliate, over 1 lin. long. Anthers 2 lin. long. Pedicelled spikelets lanceolateoblong, 7-8 lin. long, glabrous; lower glume about 15-nerved, one side with a marginal nerve, the other with a very narrow wing and still narrower inflexed flap, both sides (particularly the winged) more or less involute, terminal bristle up to over 2 lin. long; upper glume lanceolate, acute, slightly shorter, 3-nerved, ciliate; valves hyaline, ciliate, lower oblong, 3-nerved, 5-51 lin. long; upper linear-oblong, narrowed downwards, 1-nerved, under 5 lin.

long: anthers 3-3½ lin. long. Homogamous spikelets similar to the pedicelled members of the trio, but up to 8 lin, long, more oblong, and broader; their lower glume muticous, shortly acute, firmer, broader with narrow herbaceous wings and inflexed flaps on both sides, unequally 9-nerved between the keels, valves slightly longer. —Anthistiria abussinica, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 449. Andropogon exothecus, Hack. in DC, Monogr. Phan. vi. 632; Durand & Schinz, Consp. Fl. Afr. v. 711: Schweinf, in Bull, Herb. Boiss, ii. App. ii. 16, 94: Engl. Hochgebirgsfl. Trop. Afr. 115, not in Glied, Veg. Usambara, 57, 58; Pilger in Engl. Jahrb. xxx. 268: Chiov. in Ann. Istit. Bot. Roma, viii, 289.

Nile Land. Eritrea: Amasen; Sala Dharo, 7550 ft., Pappi, 2290; Lesa Mountains, Pappi, 4702, 4903; grassy slopes of Mount Bizen, 5900 ft., Schweinfurth, 2011. Ambelaco, near Maldi, Schweinfurth, 41. Ocule Cusai; Soyra Mountains, 9200–9850 ft., Pappi, 1260. Scimezana; Guna-Guna, 7200 ft., Pappi, 666. Abyssinia: Tigre; Mount Scholoda, Schimper, 407! Wohabit, Schimper, 514! Mount Hedja, Schimper, 1016! Samen; Ghaba Valley, Steudner, 1090! Ankober, Roth! Arussi Country, Drake-Brockman, 166! Geru Abbas, Drake-Brockman, 251! and without precise locality, Schimper, 356! 1984! British East Africa; Mount Kenya, 7500 ft., Battiscombe, 842! Mau, 9000 ft., Battiscombe, 285!

Mozambique Distr. German East Africa: Kilimanjaro, 8300-11,000 ft., Johnston, 37! Ehlers, 26. Marangu, 5600-8850 ft., Volkens, 712! 870! 984! Kinga Mountains, 6550 ft., Goetze, 902. Nyasaland; near Soche Hill, 3000 ft., Kirk! Nyika Plateau, 6000-7000 ft., Whyte!

45. MONOCYMBIUM, Stapf.

Spikelets 2-nate, those of each pair differing in sex and structure · otherwise alike in shape, one sessile, the other pedicelled on the articulate fragile rhachis of many-jointed solitary racemes, terminating the culms and their branches; each raceme supported by a spatheole and forming with it a monostachyum; monostachya collected into loose spatheate panicles; the fertile spikelets falling with the adjacent joint and the accompanying pedicel; joints and pedicels finely filiform with truncate tips. Florets 2, lower reduced to an empty valve, upper \(\) in the sessile spikelets, of in the pedicelled. Sessile spikelets dorsally flattened with rounded sides, awned; callus short and obtuse, indistinctly marked off from the lower glume, obscurely bearded. Glumes subequal, thinly cartilaginous, the lower obtuse, with narrow involute margins, not or very obscurely keeled near the tips, the upper boat-shaped, rounded on the back, laterally compressed and keeled in the upper third, usually aristulate, 3-nerved. Valve of the lower floret hyaline, ciliate, of the upper eciliate, deeply 2-fid with a hyaline base, margins and lobes, otherwise cartilaginous, eciliate, delicately awned from between the lobes. Valvule 0. Lodicules 2, minute, cuneiform, glabrous. Stamens 3. Stigmas laterally exserted; styles terminal. Grain oblong, dorsally slightly compressed; embryo





about half the length of the grain. Pedicelled spikelets in outline and size very similar to the sessile, but muticous. Valves of both florets developed, hyaline, or the upper more frequently suppressed.—A perennial grass with the coloured cymbiform spatheoles of a *Hyparrhenia* of the *Cymbaria* group, but easily recognized by its solitary racemes.

Species 1, throughout Tropical and South Africa.

1. M. ceresiiforme, Stapf. Perennial, mostly densely cospitose, 1-4 ft. high, with intravaginal innovations. Culms erect, rarely ascending from a geniculate or subprostrate base, slender. 6- or more-noded and simple below the panicle, very rarely with leafy branches from the lowest nodes (specimens with a geniculate or prostrate base), glabrous, smooth. Leaf-sheaths terete, tight, glabrous or hairy to villous, the lowest longer than or as long as the internodes, the remainder distinctly shorter; ligules short to very short, rounded or truncate: blades linear from an equally wide base. tapering to an acute point, 2-6 in. by $1-2\frac{1}{2}$ lin., flat, more or less erect and rather firm, glabrous or hirsute to villous, pale green. often at length turning red, midrib white above, slender, primary lateral nerves about 3 on each side. Spatheate panicle narrow, very loose, up to 1½ ft. long, often much reduced, primary internodes in strong specimens up to about 7, the lowest 3-4 in. long, rarely longer, the following very gradually decreasing; primary branches forming 5-1-rayed more or less distant tiers: lower tiers often with a compound 1-2-noded ray, all other rays simple, finely filiform, more or less hairy upwards and bearded at the tips, those of the lower tiers usually very unequal and up to 3 or 4 or more in. long, of the upper more or less equal; lower subtending leaves like the preceding ones, but with more reduced blades; the sheaths of the following more or less spathaceous, but narrow with rudimentary setaceous blades, the uppermost spatheoloid. Spatheoles narrowly and permanently cymbiform, linear-lanceolate to lanceolate, acutely acuminate, 10-20 lin. by 1-2 lin. (in profile), scarious, glabrous, reddish, purplish to dark brown, often brilliantly coloured; peduncles very short, permanently enclosed in the spatheole, slightly hairy upwards. Racemes somewhat secund and usually so enclosed in the spatheoles that only the pedicelled spikelets are exserted, more rarely the upper part or the whole of the raceme protruding laterally, 7-8lin.long, 6-8-awned; joints and pedicels about \(\frac{3}{4}\) lin.long. Sessile spikelets oblong, 1\frac{1}{2}-2 lin, long, straw-coloured or tinged with brown, hairy to villous or glabrescent, hairs white. Lower glume delicately 8-nerved, the 2 outermost nerves close, the following short, evanescent below the middle, the 2 innermost percurrent, middle nerve 0; upper glume slightly longer, bristle up to 3 lin. long, rarely absent. Lower floret: valve lanceolate-oblong, obscurely 2-nerved or nerveless, up to 2 lin. long. Upper floret: valve linear-cuneate, 2-fid to almost

the middle, up to $1\frac{1}{2}$ lin. long, lobes linear-lanceolate acute; awn fine, 5–7 lin. long, kneed at and twisted below the middle; column dark, scabrid, bristle paler, minutely scaberulous. Anthers 1 lin. long. Grain oblong, $\frac{3}{4}$ lin. long. Pedicelled spikelets: lower glume much firmer than that of the sessile spikelets, subobtuse, finely and unequally 7–11-nerved, upper not compressed upwards, 3–5–7-nerved; lower valve ovate-oblong to oblong, acute, 3-nerved, upper if present narrower, 1-nerved.—Andropogon ceresiæformis, Nees, Fl. Afr. Austr. 109; Steud. Syn. Pl. Glum. i. 383; Hack. in Hook. Ic. Pl. t. 1870, and in DC. Monogr. Phan. vi. 398; Durand & Schinz, Consp. Fl. Afr. v. 708; Franch. in Bull. Soc. Hist. Nat. Autun, viii. 20 (of reprint); Rendle in Cat. Afr. Pl. Welw. ii. 145; Cheval. Sudania, 77; Eyles in Trans. Roy. Soc. S. Afr. v. 295.

Upper Guinea. French Guinea: Kouroussa, Pobeguin, 511! Togo: Agome Mountains, Baumann, 346! Northern Nigeria: Abinsi, Dalziel, 893! Jeba, Barter! Lokoja, Dalziel, 284! confluence of Niger and Benue Rivers, Barter!
North Central. Middle Oubangui: confluence with the Kemo River, Cheva-

lier. 5362!

Lower Guinea. French Congo: Brazzaville, Chevalier, 11246! Mpila, Thollon, 47! Belgian Congo: Stanley Pool District, Gillet, 2304! north of the lower Kasai river, Luja, 198! Angola: Benguella; in loose sandy soil at Campulna, Gossweiler, 2788! Country of the Ganguellas and Ambuellas, Gossweiler, 4074! Huilla; Humpata District, Serra de Oahuia, Welwitsch, 2667!

Mozambique Distr. German East Africa: Kyimbila; Mabila Mountains, 1550 ft., Stolz, 2640! Nyasaland: between Kondowe and Karonga, Whyte! Shire Highlands, Buchanan, 16! Mount Mlanje, Adamson, 405! 422! Rhodesia: Salisbury and Inyanga District, Mundy! M'rewa, Appleton, 33!

Also found in South Africa from North Transvaal to Pondoland in Natal.

Hackel, *l.c.*, 399, describes 2 vars., *breviaristatus* and *submuticus*, based on Schweinfurth 2261 and 2191 respectively, which are stated to differ from the usual form in having the bristle of the upper glume and the awn of the upper floret of the sessile spikelet either reduced (*breviaristatus*) or quite suppressed (*submuticus*). Intermediate conditions, however, occur in the same raceme, hence it is hardly necessary to distinguish these forms as varieties. Schweinfurth 2261 was collected at Gir, in Bongoland, and 2191 near Ghatta's Scriba in Jur; a var. *hirtellus* described by Franchet, *l.c.*, and collected near Brazzaville by Thollon and again by Chevalier, appears to be merely a depauperated state; the same applies to Chevalier's plant from the Upper Oubangui.

46. ANADELPHIA, Hack. in Engl. Jahrb. vi. 240.

Spikelets 2-nate, those of each pair differing in sex and in shape (slightly) and structure, one sessile, the other pedicelled (rarely solitary and accompanied by an empty pedicel) on the articulate fragile rhachis of 1- to many-jointed solitary racemes, terminating the culms and their branches; each raceme supported by a spatheole and forming with it a monostachyum; monostachya collected into a spatheate panicle; the fertile spikelets falling with the adjacent joint (if any) and the accompanying pedicel; joints and pedicels very finely filiform, with truncate tips. Florets 2, lower reduced to an empty valve, upper $\mbox{\sc d}$ in the sessile spikelets, $\mbox{\sc d}$ or neuter

201. 1934 Reznik, Rev. Bat. appi. 14:197-

Guinea gall. Jugarenter 253

Auren gred Jeogram-Filip 351d



in the pedicelled. Sessile spikelets subterete or when mature quite terete, rarely distinctly compressed from the back when in flower; callus short or more or less elongated and very acute, shortly bearded. Glumes subequal, coriaceous to subcoriaceous downwards; the lower 2-dentate or 2-mucronate with involute margins up to two-thirds or more, then finely keeled, the upper boat-shaped, rounded on the back, keeled, usually minutely emarginate and with a fine bristle from the notch, 3-nerved. Valve of lower floret hyaline, ciliate, of upper eciliate, more or less 2-fid, with the base, margins and lobes hyaline, awned from between the lobes, awn distinctly differentiated into column and bristle. Lodicules 2, minute, glabrous. Stamens 3. Stigmas laterally exserted; styles terminal, united at the base. Grain subterete to terete. shortly beaked from the persistent style-base; scutellum half the length of the grain. Pedicelled spikelets similar in outline to the sessile, but acuminate and usually somewhat longer, often with an elongated callus; lower glume with or without a terminal bristle, upper always muticous. Valves of both florets developed, hyaline, rarely the upper suppressed.—Perennial (? always) grasses with narrow blades and narrow stiff and contracted or open and more or less flaccid spatheate panicles.

Species 9, endemic in West Africa.

*Upper glume of sessile spikelet aristulate: awn of fertile

floret 4-18 (rarely 21) lin. long.

Racemes reduced to a single pair of spikelets; panicle decompound, lax and flaccid; upper simple rays 6-3 lin. long; peduncle at maturity shorter (4-4) lin. long) than the spatheole; spikelets small (sessile 2 lin., pedicelled up to 3 lin. long); awn of fertile floret 10 lin. long

... 1. A. trepidaria.

Racemes of 1-5 sessile and as many (or more by 1) pedicelled spikelets (or empty pedicels); if only I sessile spikelet then the peduncle more or less (often far) exserted from the spatheole.

†Sessile spikelets 2-2½ lin., pedicelled 2-3 lin. long; awn of fertile floret 4-7 lin. long.

Sessile spikelets glabrous and glossy except on the callus and acumen; simple rays 6-12 lin. long; spatheoles 7-10 lin. long.

Peduncles at maturity more or less exserted terminally from the spatheole; racemes

with 1-4 sessile spikelets.

Paniele decompound, lax and flaceid; rays and peduncles capillary or almost so, the latter 10-16 lin, long; awn 4-6 lin, long, pale brown, almost concolorous; blades of upper leaves 2-2\frac{1}{2} lin. wide, slightly contracted and rounded at the base ... 2. A. leptocoma.

Panicle less compound, stiff and contracted; rays and peduncles finely filiform, the latter 9-12 lin, long; awn 7 lin. long, column dark brown; blades of upper leaves not quite I lin. wide, passing gradually into the base 3. A. tenuifolia,

Peduncles very short (3 lin. long when in flower); panicle narrow and stiff, all the tiers distant and scanty; racemes with 3-5 sessile spikelets; awn very delicate, concolorous, 5 lin. long; upper leaf-blades very long and narrow 4. A. longifolia.

Sessile spikelets pubescent; simple rays 48-24 lin. long, the outermost of some tiers frequently barren, with crowded short normal leaves, hence the panicle interspersed with leaf-tufts

(anomalous?) 5. A. pubiglumis. ✓ ††Sessile spikelets 2¼-4 lin., pedicelled 3½-6 lin. long; awn of fertile floret 8-21 lin. long; racemes

Peduncle very much shorter (2-3½ lin. long) than and permanently enclosed in the spatheole; awns 1-2 in. long.

Sparingly hairy to glabrous; the awned valve shortly 2-lobed or 2-toothed 7. A. arrecta.

Very hairy all over; the awned valve 2-fid to the middle 8. A. afzeliana.

**Upper glume of sessile spikelet without a bristle, 3-dentate; awn 3 in. long; racemes with 7 sessile and 2 pedicelled spikelets...

2 pedicelled spikelets 9. A. trispiculata.

1. A. trepidaria Stapf. Perennial (?). Culms slender, terete or somewhat compressed near the base. 3-noded below the panicle. Leaf-sheaths tight, finely striate, gradually passing into the blades, up to over 1 in. long, the lower purplish; ligules very short, rounded, ciliolate; blades narrowly linear, long-tapering to a setaceous point, 1½-5 in. long, ½ lin. wide, flaccid, flat or involute, minutely papillose near the base, otherwise glabrous, smooth below, midrib wide and whitish above, very slender and prominent below, primary lateral nerves 2 on each side, very fine. Spatheate panicle loose, decompound to the third degree, $\frac{1}{2}$ -1 ft. by 2-4 in. or more or less reduced and then usually narrow; primary internodes up to 7 or 8, lowest about $3\frac{1}{2}$ in. long, the following gradually decreasing; primary tiers up to 5-rayed, their rays very unequal and (except those of the uppermost) usually all compound, the longest of the lower tiers up to over 6 in. long, flexuous to flaccid, with up to 7 secondary mixed 4- or fewer-rayed tiers, their compound rays bearing 3-1 tertiary tiers of up to 4 simple rays; ultimate (simple) rays subcapillary, 6-3 lin. long, asperulous; lower subtending leaves like the preceding ones with subfiliform blades often 4-6 in. long, the upper with very narrow spathaceous sheaths and rapidly reduced or (the uppermost) suppressed blades. Spatheoles very narrow, scarious, $\frac{1}{2}$ in. long, pale brown or purplish, usually with a few long fine tubercle-based hairs; peduncles at length up to 4 lin. long, enclosed in the spathe or their tips laterally exserted, scaberulous.

6 = Pobequirea hamata 7 = Pobequirea apzeliana 8 = Pobequirea apzeliana 9 = Pobequirea Para - F. J. J. 1950



Racemes reduced to a sessile and a pedicelled spikelet; pedicel finely filiform, shortly ciliate, 1½ lin. long. Sessile spikelet narrowly lanceolate, up to 2 lin. long, including the short bearded callus. Glumes subequal, acuminate, glabrous below the puberulous or scaberulous acumen or quite glabrous except for the short scabrid keels: lower chartaceous. 2-mucronate or 2-aristulate, very finely 5-7-nerved, somewhat flat on the back, but with the sides rounded; upper glume lanceolate, subtruncate, 1-3-nerved, with a very fine bristle about 3 lin. long. Lower floret reduced to an oblong very obtuse hyaline nerveless or very obscurely 2-nerved valve, $1\frac{1}{2}$ lin. long, ciliate upwards. Upper floret &: valve lanceolate, 2-fid to about the middle, 1 lin. long, awn about 10 lin, long, fine, scaberulous, kneed at and twisted below the middle; valvule 0. purple, 1½ lin. long. Pedicelled spikelet of or barren, narrowly lanceolate, acuminate, $2\frac{1}{4}$ -3 lin. long; glumes very similar, the lower 7-9nerved, the upper 5-nerved; lower valve 3-nerved, upper, present, narrowly linear-lanceolate, very acute, 1-nerved, ciliate, awnless, up to 1 lin. long.—Andropogon trepidarius, Stapf in Journ. de Bot. xix 100

Upper Guinea. French Guinea: Kouroussa, Pobeguin, 524! 531!

(Jim) 1919 = Same filger 1917

2. A. leptocoma, Stapf Perennial, innovations intravaginal. Culms up to 5 ft. high, erect, glabrous, many-noded below the panicle. Leaf-sheaths somewhat compressed, keeled and loose, very firm, glabrous: ligule reduced to a ciliolate rim; blades linear, from an equally wide slightly rounded base, long-tapering, 8-12 in. long by 2-2½ lin., convolute in bud, then flat, somewhat rigid, green, at length brownish, glabrous or hairy above the ligule, smooth, scabrid along the margins, midrib slender, prominent below. theate panicle subfoliate, loose, decompound to the third degree, up to over 1 ft. long and 5 in. wide; primary internodes 4-5, the lowest 3-4 in. long, the following gradually decreasing; primary tiers of 4-6 mostly compound and very unequal rays, the longest of the lower tiers bearing 7-5 mixed and up to 6-rayed secondary tiers, their compound rays with up to 4 3-2-rayed tertiary tiers; ultimate rays subcapillary, $\frac{3}{4} - \frac{1}{2}$ in. long, more or less flexuous, at length slightly arched or straight; subtending leaves like the preceding ones with well-developed blades (of the lowest up to over 3 in. by $2\frac{1}{2}$ lin.), but gradually shorter upwards. Spatheoles very narrow, acute, scarious, 7-10 lin. long, reddish, glabrous; peduncles at length exserted by 3-6 lin., capillary, glabrous, very slightly thickened at the tips. Racemes up to 6 lin. long, lax, with 1-4 sessile and as many pedicelled spikelets or with an additional but rudimentary terminal pedicelled spikelet or barren pedicel; joints subcapillary, 1½-1 lin. long, shortly ciliate; pedicels very similar, Sessile spikelets narrowly linear-lanceolate, 2-23 lin. long.

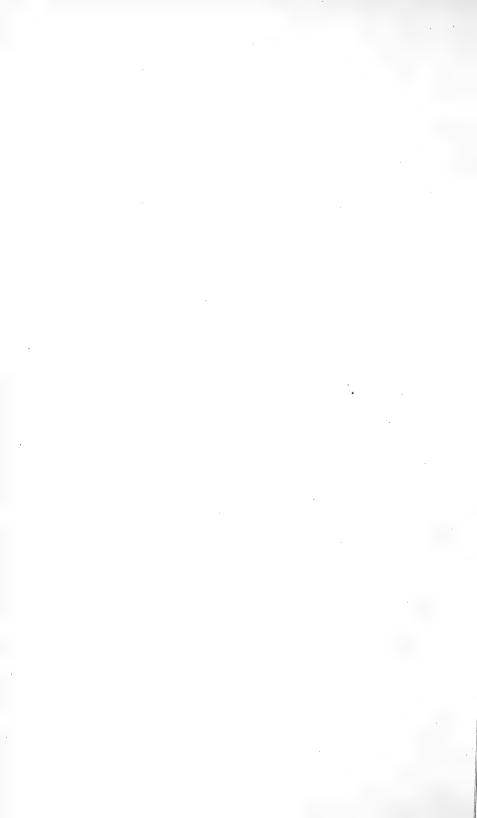
including the callus; callus short, acute, with a white or palefulvous beard of its own length. Glumes equal, acuminate, glabrous below the scaberulous acumen; lower thinly coriaceous, 2-toothed, 4-5-nerved, the nerves running into the scaberulous keels distinct. the others very faint, back slightly convex, smooth, scaberulous upwards; upper glume linear-oblong, firmly membranous, obscurely 2-toothed, with a fine bristle 2-2½ lin, long from between the teeth. 1-nerved, glabrous. Lower floret reduced to a linear-lanceolate acute hyaline nerveless valve, almost as long as the glumes. Upper floret 0, $1\frac{1}{4}-1\frac{1}{5}$ lin. long: valve linear-oblong, 2-fid to one-third or half, lobes acute, glabrous: awn very fine, 4-6 lin, long, kneed and twisted below the middle, column brown, scaberulous like the paler bristle; valvule 0. Anthers \(\frac{2}{3}\)-1 lin. long. Pedicelled spikelets similar to the sessile, but the lower glume 7-9-nerved and the upper muticous or sometimes obscurely setigerous, 3-5-nerved; upper valve entire, awnless, 1-nerved,—Anadelphia virgata, Hack, in Engl. Jahrb. vi. 241. Andropogon leptocomus, Trin. in Mém. Acad. Pétersb. 6me sér. ii. 264; Hack. in Naumann, Reise d. Gazelle, iv. Bot. t. 2, fig. 2; Stapf in Johnston, Liberia, ii. 666. A. tenuiflorus. Stapf in Journ, de Bot, xix. 103.

Lower Guinea. Sierra Leone, Blyth! Liberia: Monrovia, Naumann, 28! Dinklage, 1770! 2512!

Hackel, in DC. Monogr. Phan. vi. 396, has suggested that this may be Diectomis fasciculata, Beauv., Agrost. Expl. planch. 15, t. xxiii. fig. 6. Whilst the figure leaves no doubt as to its generic identity, the identification of the species is somewhat uncertain. Assuming, however, that Beauvois' figure represents a part of a panicle, magnified about $2-2\frac{1}{2}$ times, as is very likely, and allowing for a certain heaviness of the engraving and an exaggeration of the dentation of the glumes, the resemblance to A. Leptocoma is indeed very great. Unfortunately Beauvois' specimen seems to have been lost.

3. A. tenuifolia, Stapf. Perennial (?). Culms (base unknown) up to over 3 ft. high, slender, terete, erect, firm, glabrous. Leafsheaths (upper) terete, tight, firm, glabrous; ligules reduced to a ciliolate rim; blades filiform-linear, passing gradually at the base into the sheath or narrower than the same, up to 6 in. by less than 1 lin., flexuous, hirsute towards and bearded at the base, otherwise glabrous, slightly rough above and on the margins upwards, midrib prominent below, whitish above, lateral nerves close and more or less prominent. Spatheate panicle narrow, erect, compound with very few or no branches of the third order, up to over $\frac{1}{2}$ ft. by $\frac{1}{2}$ in.; primary internodes 8-9, the lowest up to over 5 in. long, the following gradually decreasing; primary tiers of up to 4 very unequal rays or the lowest 1 or 2 branches undivided at the base, the longest rays of the lower tiers almost up to 1 ft. long, suberect, very slender, bearing 5-7 secondary tiers of up to 4 nearly always simple rays, these like all the upper simple rays \(\frac{3}{4} - \frac{2}{3}\) (rarely 1) in. long, finely filiform, scaberulous, not or very shortly exserted from their spathes; lowest





subtending leaves like the preceding ones but with more filiform and shorter blades, these rapidly decreasing upwards and becoming almost setaceous. Spatheoles very narrow, acute, scarious, 8-9 lin. long, reddish, glabrous, early tightly inrolled; peduncles at length exserted by 1-3 (rarely more) lin., very finely filiform, scaberulous upwards with slightly thickened tips. Racemes up to 4 lin. long, lax with 1 or 2 sessile and 1-3 pedicelled spikelets or barren pedicels; joints subcapillary, 1 to almost 2 lin. long, very shortly ciliate; pedicels similar, sometimes more or less reduced and quite barren. Sessile spikelets linear-lanceolate, acuminate, 2-24 lin, long, including the short subacute pale and short-bearded callus. Glumes equal, acuminate, glabrous and smooth except for the short scaberulous keels: lower subcoriaceous, sharply 2-toothed, very faintly 7-9-nerved; upper lanceolate-oblong, somewhat thinner, obscurely notched with a fine bristle not much over 1 lin, long. 3-nerved. Lower floret reduced to an oblong obtuse nerveless ciliate purple hyaline valve. Upper floret &, 1 lin. long: valve 2-fid to the middle, lobes lanceolate, acute, eciliate: awn very fine. about 7-8 lin, long, kneed at and twisted below the middle, column dark, bristle pale, scaberulous: valvule 0. Grain linear-oblong in outline, dorsally more or less compressed, 1 lin. long, deep purple to almost black. Pedicelled spikelets or neuter, similar to the sessile but slightly longer and acutely to setaceously acuminate, lower glume 7-9-, upper 5-3-nerved: both valves purple. very narrow.

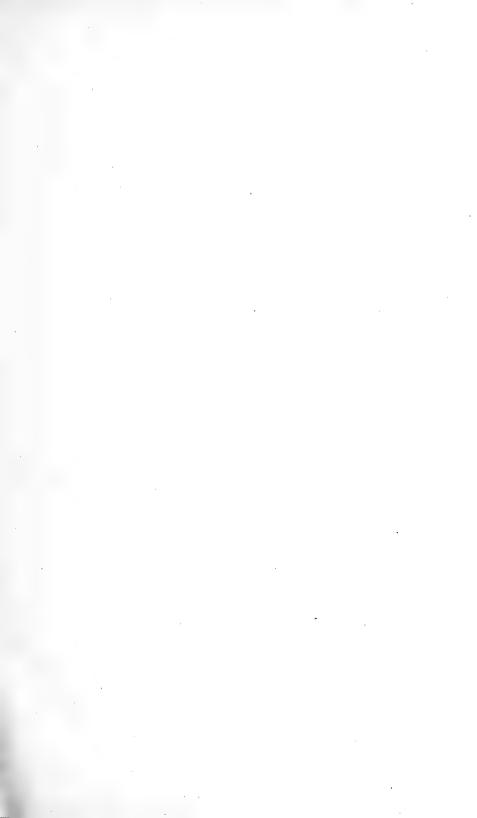
Upper Guinea. Futa Jallon: in damp places near Timbo, Pobéguin, 1788! 1789!

4. A. longifolia, Stapf. Perennial (?). Culms (base unknown) up to 3 ft. high, erect, slightly compressed, particularly in the upper part of the internodes, firm, glabrous, very smooth, glossy, pale, if not whitish-pruinose below the nodes. Leaf-sheaths (upper) slightly compressed and keeled upwards, tight, firm, glabrous; ligules very short, truncate, ciliolate; blades erect, narrowly linear, passing gradually into the sheath, up to over 1 ft. by 1-1; lin., rather rigid and firm, with some soft long hairs above the ligules, otherwise glabrous, smooth or almost so except in the upper part where they are more or less rough on the face and the margins, midrib slender, prominent below, lateral nerves fine, close, numerous. Spatheate panicle narrow, erect, stiff, compound, with very few branches of the third order, up to almost 2 ft. by 2-3 in., primary internodes about 10, the lowest 4-41 in. long, the following gradually decreasing; primary tiers of up to 3, rarely 4, very unequal rays or the lowest branches undivided at the base, the longest up to ½ ft. long, erect, slender, bearing about 6 distant secondary tiers of usually 2 unequal rays (sometimes one of them compound in the lowest part of the paniele, 2-noded); ultimate (simple) rays enclosed in or shortly

exserted from their spathes, filiform, smooth, $1-\frac{3}{4}$ in. long; lowest subtending leaves like the preceding ones, with well developed blades up to 6 in. by over 1 lin., these rapidly decreasing in the following Spatheoles very narrow, acute, 8-10 lin, long, herbaceous to scarious, reddish, glabrous, obliquely spreading; peduncle finely filiform, scaberulous unwards, about 3 lin. long when flowering. Racemes up to 5 or 6 lin. long, lax, with 3-5 sessile and as many pedicelled spikelets or pedicels; joints subcapillary, 1 lin. long, shortly ciliate; pedicels similar, if not more slender. Sessile spikelets linear-lanceolate, acuminate, $2-2\frac{1}{4}$ lin, long, including the short subacute sparingly bearded callus. Glumes equal, acuminate, glabrous and smooth except for the minutely scaberulous tips, keels short, very fine; lower subcoriaceous, 2-toothed, 7-nerved, upper lanceolate-oblong, somewhat thinner, passing into a fine bristle up to 1 lin. long, 3-nerved. Lower floret reduced to an oblong obtuse faintly 2-nerved or nerveless ciliate hyaline colourless valve. floret $, 1\frac{1}{4}$ lin. long; valve shortly 2-fid, lobes lanceolate, acute, eciliate; awn capillary, 5 lin. long, more or less bent at and twisted below the middle, straw-coloured throughout: valvule 0. Anthers Pedicelled spikelets 3, similar to the sessile but slightly longer and acutely long-acuminate, lower glume 7-9-, upper 3-5nerved; both valves colourless, the lower sub-3-nerved; the upper 1-nerved and minutely mucronulate; anthers as in the sessile spikelets.

Upper Guinea. French Guinea: Baffing valley, Pobéguin, 1789 bis!

5. A. pubiglumis, Stapf. Perennial (?). Culms (base unknown) terete, glabrous, smooth, internodes usually conspicuously exserted. Leaf-sheaths tight, terete, glabrous, or hirsute upwards with tuberclebased hairs, smooth; ligules truncate, hyaline, ½ lin. long; blades linear from an equally wide base, tapering to an acute sometimes very fine point, glabrous or sparingly hirsute below, margins cartilaginous, smooth except towards the tips, midrib slender, lateral nerves obscure or 1 or 2 on each side, more or less raised. Spatheate panicle contracted, erect, stiff, over 1 ft. long, made up of branches the lowest of which are undivided at the base or like the following may form 2-4-rayed distant often mixed tiers; compound rays with few very scanty tiers; simple rays often very long (up to 4 in.), filiform, erect, smooth to near the tips, the outermost (abaxial) often replaced (abnormally) by a barren branch with crowded normal leaves, hence the panicle is interspersed with leaf-tufts; subtending leaves like the preceding leaves with well-developed blades and upwards more inflated spathaceous sheaths. Spatheoles subherbaceous, $1\frac{1}{2}$ - $1\frac{3}{4}$ in. long, lanceolate, long-attenuated into a fine point, glabrous, dull or glaucous, purplish or reddish; peduncles filiform, enclosed in the spatheole, 1-1 lin, long, slightly rough above, with truncate





tips, showing a small circular scar. Racemes laterally shortly exserted, extremely fragile, up to 10 lin, long, consisting of up to 5 sessile and 6 pedicelled spikelets; joints filiform, the lowest rather stout, up to 5 lin. (normally?), the others more slender, shortly densely and equally ciliate along the sides, tips truncate with a circular rim; pedicels similar to the adjacent joints, but the lower at least usually shorter. Sessile spikelets lanceolate, including the very short obtuse and minutely bearded callus 2 lin. or the lowest (normally?) up to 4 lin. long, pubescent. Glumes equal; lower minutely 2-dentate or 2-mucronate, convex on the back, more or less pubescent, sometimes at length glabrescent, chartaceous, 7- or upwards 9-nerved, faint, sides involute, shortly keeled towards the tips, keels scaberulous; upper thinner, minutely emarginate or almost entire, with a fine bristle from the apex, loosely pubescent. ciliolate, 3-nerved, finely keeled upwards, keels scaberulous. Lower floret reduced to an oblong obtuse hyaline obscurely 2-nerved ciliate valve. Upper floret \heartsuit : valve oblong, $1\frac{1}{2}$ lin, long, 2-fid almost to the middle, very firm below, with the exception of the hyaline margins, 1-nerved; awn up to over 10 lin. long, kneed at and twisted below the middle, minutely white-ciliate, column almost black, bristle straw-coloured; valvule O. Anthers 1 lin. long. Pedicelled spikelet similar to the sessile, the lowest not over 3 lin, long: lower glume 9-11-nerved, upper very acute, without a mucro, 5-7-nerved: valves as in the sessile spikelet, but the lower 3-nerved and the upper hyaline, acute, entire and awnless.

Upper Guinea. Southern Nigeria: Lagos; Bere, MacGregor, 57!

All the material available (about a dozen pieces) is in an abnormal condition (prolification probably due to insect action). The replacement of the outermost simple rays of many tiers by contracted leafy branches is certainly an anomalous feature. On the other hand it is doubtful how far the elongation of the simple rays and the basal joints of the raceme and the enlargement of the lowest sessile spikelets are due to the same cause, although they seem to be affected. The spikelets described above are otherwise to all appearance normal, and by themselves are sufficient to characterize the species as distinct from the remainder of the genus.

6. A. hamata, Stapf. Perennial (?). Culms (only the upper parts known) slender, terete, glabrous and smooth, internodes long-exserted. Leaf-sheaths terete, somewhat tight, glabrous or pubescent towards the mouth, smooth; ligules truncate, up to $\frac{1}{2}$ lin. long; blades linear, tapering to a fine point, flat, up to 1 lin. wide, dull green, flaccid, softly hairy all over, midrib and nerves very fine, the latter numerous and raised above. Spatheate panicle made up of few distant flowering branches, the lowest undivided at the base, 4–6 in. long, filiform and flexuous, 2-noded, 1-rayed from the lower node or like the following forming 2–4-rayed tiers; all the rays simple, very unequal, of the lowest tiers up to $2\frac{1}{2}$ in., of the upper $\frac{3}{4}-1\frac{1}{4}$ in. long; subtending leaves like the preceding ones with well developed

upwards decreasing blades. Spatheoles very narrow, subacute. about 1 in. long, herbaceous, tightly inrolled; peduncles as long as the spathe or conspicuously exserted, puberulous upwards with very oblique tips. Racemes 9-10 lin, long, of 2 sessile and 3 pedicelled spikelets; joint and pedicels filiform, densely and shortly ciliate on both sides, 2 to over 2½ lin. long. Sessile spikelets linear-lanceolate or linear-oblong, including the callus, which is 1 lin, long and very shortly bearded on both sides and a part of the back, 3-3\frac{1}{2} lin, long, glabrous, greenish. Glumes equal: the lower minutely 2-toothed, keels scabrid upwards, nerves 6-7, fine: the upper oblong, emarginate, with a fine bristle 3-4 lin, long from the notch, slightly keeled, ciliate. Lower floret reduced to an oblong obtuse hvaline obscurely 2-nerved valve, almost as long as the glumes. Upper floret \forall : valve linear-cuneate, 2-fid to one-third, 1-nerved, lobes lanceolate-acute; awn very slender, about 8 lin. long, pale strawcoloured, kneed at and twisted below the middle, column asperulous, bristle abruptly deflexed. Pedicelled spikelets 3, very similar to the sessile, if not slightly longer; lower glume produced into a minute bristle, 9-nerved, upper slightly shorter, 5-nerved; valves similar to those of the sessile spikelet, but the upper entire and awnless: anthers 11 lin. long.

Lower Guinea. French Guinea: French Congo, without precise locality, collector not stated.

Stale 1) 7. A. arrecta, Stapf. Perennial, up to 12 ft. high (Hens). simple and erect, glabrous, usually pruinose or finely pubescent near the nodes, 4-many-noded (?) below the panicle. Leaf-sheaths tight, glabrous or more or less hairy upwards, sometimes finely pubescent at the base: ligules very short, rounded or truncate, ciliolate, decurrent on the sheath: blades narrowly linear from an equally wide base, long-attenuated to a setaceous point, rather firm, up to 10 in, long by 2 lin, wide, flat, loosely hirsute, particularly towards the junction with the sheath, or glabrous, scabrid along the margins, midrib rather wide on the upper side, slender below, lateral nerves fine and close. Spatheate panicle erect, compound to the second degree, more or less contracted, up to over 1\frac{1}{3} ft. long; primary internodes 6-10, lowest rarely over 5 in. long, the following at first gradually, then rapidly decreasing, the upper usually scaberulous or very finely pubescent upwards and shortly bearded at the nodes; primary tiers up to 4-rayed (the lowest branch often undivided at the base, up to over 1 ft. long and up to 7-noded), rays very unequal and except the uppermost usually all mixed, their compound rays with 3-1 (simple)-rayed secondary tiers: ultimate rays finely filiform, slightly thickened and rough towards the unilaterally bearded tips, those of the lower tiers up to 2 in., of the uppermost $\frac{3}{4} - \frac{2}{3}$ in. long; lower subtending leaves like the preceding ones with long blades, the latter rapidly decreasing and finally quite suppressed





in the upper part of the panicle, uppermost spathes therefore quite spatheoloid. Spatheoles linear-lanceolate, acute, 1 in, long, subherbaceous, greenish brown or glaucous and purplish, glabrous or very sparingly hairy; peduncles densely puberulous upwards, much shorter than and enclosed in the spatheole, on maturity 23-4 lin. long. Racemes of 2 sessile and 3 pedicelled spikelets, about 7-9 lin, long: joint and pedicels filiform, shortly ciliate on both sides. glabrous on the back, about 2-21 lin. long. Sessile spikelet linearoblong, 2\frac{1}{2}-3 lin, long including the callus, glabrous, pale to chestnut. brown and glossy below the middle, pale green above; callus almost pungent, 3-1 lin, long and very densely silky bearded. Glumes equal: lower coriaceous, linear-oblong, truncate, sides obtusely rounded to far beyond the middle, then scaberulously and finely keeled, 6-7-nerved, nerves slender but distinct: upper glume linear-oblong, obtuse or slightly emarginate, with a bristle up to 6-7 lin. long, 3-nerved, margins finely ciliate. Lower floret reduced to a narrowly oblong hyaline 2-nerved ciliate valve as long as the glumes. Upper floret \forall : valve linear, oblong-cuneate, shortly 2-lobed, under 2 lin. long, glabrous, awn comparatively stout, 1-11 in. long, kneed at the middle, column twisted, dark brown, scabrid, bristle vellowish; valvule 0. Anthers $1-1\frac{1}{4}$ lin. long. Pedicelled spikelets 3 or barren, very narrowly linear-lanceolate, long-acuminate, 4-6 lin. long, glabrous; glumes subequal, thinly coriaceous, each passing into a mucro or short bristle; lower 7-9-nerved, upper somewhat shorter, 3-5-nerved; valves linear-oblong, acute, ciliate, lower faintly 3-nerved, upper if present 1-nerved.—Andropogon arrectus, Stapf in Journ. de Bot. xix. 101. A. glaucopurpureus, Stapf, l.c. 102.

Upper Guinea. French Guinea: Futa Jallon; between Soumbalako and Boulivel, Chevalier, 18665! Kouroussa, Poléguin, 519! 520! Baffing Valley, Pobéguin, 1784 bis! Timbo, Pobéguin, 1794! 1795! Sierra Leone: Jigaya, Thomas, 2487! Gold Coast: North-west Axim; Kikum, fresh water grass swamps, Chipp, 311! Dahomey, Dubard! Southern Nigeria: Lagos, Mac-Gregor, 320!

Lower Guinea. Belgian Congo: Stanley Pool, in dry sandy places, Hens, B. 76!

(Rudk)
8. A. afzeliana, Stapf. Perennial. Culms between 2 and 3 ft. high, rather stout below, terete, glabrous, 5-6-noded, with some barren branches from the lower nodes. Leaf-sheaths terete, softly hairy to villous with the exception of the glabrous base above the bearded internodes; ligules very short, truncate, glabrous; blades linear from an equally wide base, long-tapering to a fine point, up to 7 or 8 in. long and over 2 lin. wide (flattened out), softly hirsute to villous on both sides, midrib white, slender below, wider above, lateral nerves numerous and close. Spatheate panicle very scanty, narrow, up to almost 1 ft. long; primary internodes about 4, the lowest up to 4 in. long, the following very gradually decreasing;

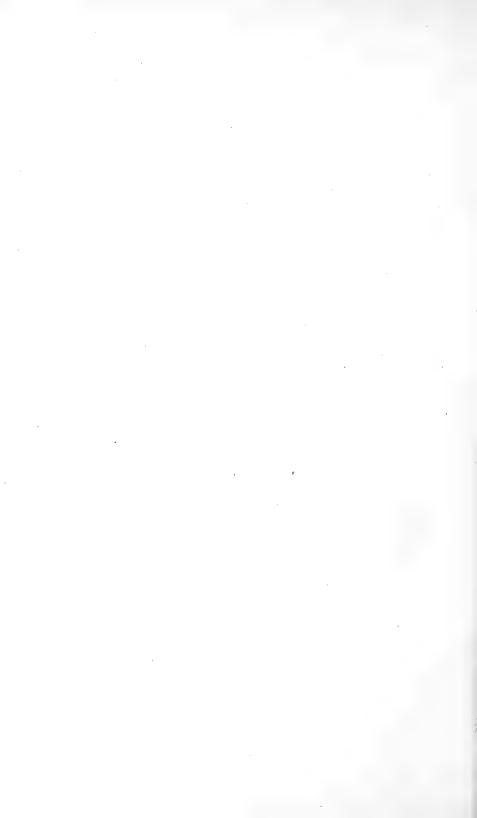
primary tiers (the lowest branch sometimes undivided at the base)

2-3-raved, compound rays, if any, up to 3-noded, very slender, flexuous and suberect: simple rays up to 2 or even 25 in, long, very fine: subtending leaves like the preceding ones with upwards rapidly Spatheoles narrowly lanceolate, acute, 9-10 lin. reduced blades. long, subherbaceous, sparingly hairy, suffused with purple: peduncles 3-5 lin, long, enclosed in the spatheole, pubescent. Racemes laterally exserted from the middle of the spatheole, consisting of 2 sessile and 3 pedicelled spikelets; joint and pedicels filiform, about 2 lin. long, densely silky. Sessile spikelets linear-oblong, up to 2½ lin. long, including the callus, which is up to ½ lin. long and silky-bearded. Glumes equal; lower truncate, coriaceous, brown, convex and smooth on the back, pale and scaberulous or puberulous at the tips, indistinctly 7-nerved, sides rounded far beyond the middle, then keeled, keels scabrid; upper glume oblong, truncate to subemarginate, slightly keeled upwards, 3- to sub-5-nerved, ciliate, with a terminal bristle 4-5 lin. long. Lower floret reduced to an oblong obtuse hyaline sub-2-nerved upwards ciliate valve. 2 lin. long. Upper floret \(\times : \) valve linear-cuneate, 2-fid to the middle, with acute narrow lobes; awn $1-1\frac{3}{4}$ in. long, kneed and twisted below the middle, column brown, scaberulous, bristle somewhat paler. Anthers 1 lin. long. Pedicelled spikelet 3, very narrowly linear-lanceolate, long and finely acuminate, $3\frac{1}{2}$ -4 lin. long; glumes subequal, lower 7-10-nerved, upper slightly shorter, 3-5-nerved, delicately ciliate; lower valve 2½ lin. long, like that of the lower floret in the sessile spikelet: anthers 2 lin. long.—Andropogon afzelianus, Rendle in Journ. Bot. 1893, 357. A. eriocoleus. K. Schum, in Engl. Jahrb, xxiv, 329.

Upper Guinea. Sierra Leone: Regent, Scott Elliot, 4108! and without precise locality, Afzelius!

9. A. trispiculata, Stapf. Culms (only the upper parts known) terete, glabrous and smooth. Leaf-sheaths terete, glabrous, smooth, tight; ligules membranous, rounded, very short; blades narrowly linear, tapering to an acute point, not quite 1 lin. wide, glabrous or with a few hairs near the junction with the sheath, smooth below, margins recurved, spinulously ciliolate, midrib and nerves slender, slightly prominent. Spatheate panicle very narrow, over 1 ft. long, made up of few erect flowering branches, these subfastigiate, 4-5-noded, bearing from the first or second node upwards 1-2rayed tiers; rays appressed, unequal, the longer $1-\bar{1}\frac{1}{2}$ in. long, filiform, glabrous; lowest subtending leaves like the preceding ones, the following spathaceous with rapidly reduced blades. linear-oblanceolate, narrow, very acute, about 1 in. long, scarious, glabrous, tightly inrolled downwards, widened and open upwards; peduncle enclosed, finely filiform, about 6 lin. long, not thickened upwards. Raceme reduced to 1 sessile and 2 pedicelled spikelets; pedicels subequal, filiform, tightly appressed to the sessile spikelet,





densely and equally ciliate along both edges, cilia fulvous. Sessile spikelet oblong-linear, 4 lin. long, including the pointed densely and shortly bearded callus, which is 1 lin. long. Glumes equal; lower coriaceous, chestnut-brown, shining, rounded on the back and sides, very indistinctly 2-keeled at the obtuse or truncate scaberulous tips. more or less appressedly pubescent below the middle, 7-nerved: upper oblong, rounded on the back, subcoriaceous, minutely 3toothed, ciliolate upwards, 3-nerved. Lower floret reduced to an oblong truncate hvaline ciliate shortly 2-nerved valve. Upper floret \(\): valve stipitiform, with 2 short very narrow and acute hyaline lobes at the base of the awn, which is about 3 in. long, kneed at and loosely twisted below the upper third, column straight or flexuous, brown or yellowish like the spreading or reflexed bristle, both minutely scaberulous: valvule 0. Anthers 13 lin. long. subcylindric, 2 lin. by \(\frac{3}{8}\) lin., purple. Pedicelled spikelet \(\frac{3}{5}\), narrowly linear, tapering to an acute point, up to 5 lin. long, glabrous; glumes somewhat unequal and chartaceous, greenish, the upper 13nerved, the lower 11-nerved, about 4 lin. long; lower valve about as long as the upper glume, 5-nerved, ciliate, upper similar, slightly shorter, hvaline, sub-3-nerved; anthers 2 lin, long.

Upper Guinea. French Guinea: Baffing Valley, Pobeguin, 1787*!

47. MONIUM, Stapf.

Spikelets all alike, solitary, \u22002, awned, with an acute bearded callus, borne on and readily disarticulating from a very slender peduncle, supported by and permanently enclosed in a spatheole. the whole representing an extremely reduced monostachyum; monostachya collected in a usually much contracted spathaceous panicle. Florets 2, lower reduced to an empty valve, upper \(\). Glumes equal, coriaceous to subcoriaceous, both rounded on the back with involute margins (hence spikelets terete); lower 2-toothed. finely or obscurely 2-keeled towards the tips, very obscurely nerved, upper produced into a fine bristle from the notched tip, sub-8-nerved. Valve of lower floret hyaline, nerveless; of upper narrowly oblong, 2-fid, with a long very slender awn from the sinus, with the base. margins and lobes hyaline, otherwise subcartilaginous. Valvule 0. Lodicules 2, minute, glabrous. Stamens 3. Stigmas laterally exserted. Styles terminal. Grain cylindric, very slender; scutellum elliptic, equalling one-third the length of the grain.—A delicate annual grass.

Species 1, endemic.

This and Cleistachne represent the most extreme cases of reduction in Andropogoneæ; but as Cleistachne in the structure of its inflorescence and spikelets betrays its derivation from Sorghum, so Monium has preserved all the other essential features of Anadelphia.

1. M. macrochætum, Stapf. Annual, up to over 1 ft. high. Culms very slender, erect, simple, 2-4-noded below the panicle. often rooting from the first node above the ground, terete, glabrous, smooth. Leaf-sheaths terete, tight, glabrous, thin, the lowest withering away: ligules very short, rounded or truncate, ciliolate: blades finely linear from an equally broad base, tapering to a fine point, 1-2 in. by \frac{1}{3} \lin., folded at first, then flat, glabrous or very finely pubescent, slightly rough on the upper side and the margins, midrib and primary lateral nerves very slender, somewhat prominent. Spatheate panicle contracted, very narrow, up to & ft. long; primary internodes up to 4, lowest up to 3 in. long, but mostly much shorter, the following gradually decreasing; primary branches forming up to 4-rayed tiers, or the lowest undivided at the base, several-noded, and often very long (10 in.); tiers with 1 compound ray or all the rays simple, very slender, angular, slightly rough upwards: lower subtending leaves quite like the preceding ones. Spatheoles very narrow and very early tightly inrolled, long and finely acuminate, \(\frac{3}{4}-1\) in. long, scarious, pale or pinkish, glabrous; peduncle enclosed in the spatheole, very finely filiform, scaberulous, with slightly thickened very obliquely truncate tips. Spikelets about 3 lin. long, chestnutbrown, glabrous except for the callus which is \(\frac{3}{4}\) lin, long and rufously bearded. Glumes minutely pubescent, scaberulous upwards, soon becoming glabrescent and glossy below; lower obscure, 6-7-nerved, upper with a delicate bristle up to over 1 lin, long. Lower floret: valve obscurely ciliolate, 1-1½ lin. long. Upper floret \(\) \(\) valve $1\frac{1}{2}$ - $1\frac{3}{4}$ lin. long, eciliolate, 2-fid to one-quarter, lobes subulate, awn slender, $1\frac{3}{4}$ -2 in. long, bent at almost a right angle above the middle, column very straight, loosely twisted, glabrous, dark-brown; bristle paler, somewhat rough. Anthers over 1 lin. long. Grain 1 lin. long.

Upper Guinea. French Guinea: near Timbo, on inundated land, Pobéguin, 1790!

48. TRACHYPOGON, Nees; Benth. et Hook. f. Gen. Pl. iii. 1133.

Spikelets 2-nate, those of each pair differing in sex and slightly in shape, both pedicelled on the tough or upwards very tardily disarticulating many-jointed rhachis of solitary, 2-nate or digitate racemes, terminating the culms; pedicels unequal (the lower very short), fused towards the base with each other and the adjacent internode of the rhachis, this and the pedicels terete or subterete, the longer of the latter disarticulating very obliquely; internodes marked off by very oblique and usually shortly bearded articulation lines; subsessile spikelets persistent; long-pedicelled spikelets falling separately. Florets 2, lower reduced to an empty valve, upper 3 or neuter in the subsessile, \(\mathref{\partial} \) in the upper long-pedicelled

Morrison the transfer of the grant of



spikelet. Fertile (upper) spikelets more or less terete, awned; callus acute to very pungent, densely bearded. Glumes equal or subequal; the lower firmly chartaceous to coriaceous, subconvolute, finely 2-keeled upwards, the inflexed margins very narrow or reduced to a mere rim, nerves 5-9 in addition to the keelnerves, mostly obscure except in transmitted light, more or less connected by transverse veins in the upper part; upper thinner, 3-nerved, grooved on either side of the rounded keel. Valve of lower floret hyaline, 2-nerved, ciliate or ciliolate upwards, of upper floret stipitiform, hvaline and 3-nerved at the base, cartilaginous upwards and passing into a flexuous or geniculate awn. Valvule very small, hyaline or 0. Lodicules 2, small, glabrous. Stamens 3. Stigmas laterally exserted: styles terminal. Grain terete: embryo about half the length of the grain. Male or neuter (lower) spikelets dorsally flattened (particularly the lower of a raceme) or more or less terete, awnless: callus 0. Glume and valve of the lower floret similar to those of the fertile spikelets. Valve of the upper floret narrow, hyaline, entire or 2-toothed, with or without a minute mucro, rarely produced into a short bristle. Stamens 3. Pistil, if present, rudimentary.—Perennial (very rarely annual?), densely caspitose grasses with more or less slender wiry culms conspicuously bearded below the nodes; the beards appressed, covering the constricted nodes; leaf-blades narrow, frequently convolute.

Species 9 or 10, all closely allied, ranging into South Africa, Madagascar, and most of the hotter regions of America.

Culms very slender, geniculate-ascending, branched, $1\frac{1}{2}$ ft. high; blades about 5 in. by $1-1\frac{1}{2}$ lin., with stiff tubercle-based hairs; annual (?) ... 1. T. Ledermannii.

Culms more robust, erect (rarely geniculate) from a dense tuft, simple; distinctly perennial.

. Leaf-blades filiform-convolute or the lower unrolled and flat when dying off and then up to slightly over $1\frac{1}{2}$ lin. wide, the longest much attenuated towards the base and there semiterete or channelled in cross

Lower glume of subsessile spikelets (particularly of lower pairs) loosely involute, dorsally much flattened, up to over I lin. wide, distinctly and often broadly winged from the keels towards the tips. wings reddish; stipules very short, of the culmleaves up to $1\frac{1}{2}$ lin. long ... 2. T. Thollonii.

Lower glume of subsessile spikelets more involute (to

almost cylindric), quite wingless, keels very finely marginate and scabrid upwards.

Awn 2½ to almost 3 in. long, spirals of column very steep and closing up so tightly as to make the column appearsolid; blades (at least the lower) at length unrolling and flat, up to $1\frac{1}{2}$ (rarely almost 2) lin. wide; ligules of culm-leaves often elongated

... . 3. T. plumosus.

... 4. T. durus.

Leaf-blades early unfolded and quite flat, up to over 2 lin. wide, rigidly erect from a gradually but slightly attenuated base 5

... 5. T. planifolius.

1. T. Ledermannii, Pilq. in Engl. Jahrb. xlviii. 342. Annual (?). Culms fascicled, geniculate-ascending, up to 1\frac{1}{2} ft. high, very slender. branched, several-noded. Leaf-sheaths narrow, smooth, glabrous or with some stiff hairs upwards; ligules firm, rather long; blades linear, long-tapering and very acute, about 5 in. by 1-1½ lin., more or less hirsute with tubercle-based hairs. Racemes solitary on the culm and its branches, at length shortly exserted from the uppermost sheath, $1\frac{2}{3}$ - $2\frac{1}{2}$ in. long, with 9-12 pairs of spikelets, the lowest imperfect, barren; internodes 1\frac{1}{4}-1\frac{1}{2} lin. long, sparingly hairy; pedicels \(\frac{3}{4}\) lin. long. Subsessile spikelets neuter. Glumes similar to those of the pedicelled spikelet (see below), but the lower less involute, rotundate-obtuse with a terminal bristle; valves 0 or 1, small and delicate. Fertile spikelets 4 lin. long including the acute densely and long-fulvo-setose callus. Lower glume firm, ovate with involute margins, upwards very shortly narrowed, truncate, sparingly setulose, 10-nerved, nerves rather prominent; upper glume narrower, rotundate-obtuse, ciliate. Lower floret reduced to a very delicate rotundate-obtuse 2-nerved ciliolate valve. Upper floret: valve thin and 3-nerved below, cartilaginous upwards, passing into an awn 2½-3 in. long, kneed above the middle, twisted and white-setulose below the knee, scabrid above, at length brown.

Upper Guinea. Cameroons: in fissures of rocks between Tukurna and

Tapare, 4400 ft., Ledermann, 5586.

2. T. Thollonii, Stapf. Perennial, densely cospitose, 3-4 ft. high. Culms surrounded at the base by the firm persistent leaf-sheaths or their remains, terete, about 5-noded, glabrous apart from the densely and appressedly white-bearded upper ends of the internodes, the hairs covering the slightly constricted sheath-bases. Leaf-sheaths firm, terete, tight, more or less produced at the mouth into short acute auricles, the lower longer, the middle and upper much shorter than the internodes, glabrous; ligules very firm, up to 1 lin. long, rounded, laterally adnate to the sheath-auricles; blades narrowly linear, convolute, rarely somewhat flattened out, tapering to a long fine point, up to 1 ft. by 1½ lin., very firm and tough, glabrous or shortly hairy just above the ligule, smooth except on the scaberulous margins and the slightly rough main-nerves of the upper side, midrib slender or stouter downwards, not prominent below, primary lateral nerves few, obscure below. Racemes solitary or 2-nate, 4-2 in. long, secund; rhachis subterete, glabrous except in the upper part Bez. Ssongela, Tanganyika, Schlieben 960.

Miller Toller or Mercel or one

along the very oblique shortly bearded disarticulation marks, internodes about 2 lin. long; longer pedicels slender, up to 1½ lin. long, glabrous or nearly so, tips very oblique. Subsessile spikelets &, the lower broad-oblong and dorsally flattened, the upper narrower upwards and more convolute, 3 lin. long, glabrous, brownish. Glumes subequal; lower coriaceous, truncate, keels winged from the middle upwards, wings firm, reddish, up to \frac{1}{4} lin. wide, scaberulous, intracarinal nerves 7, obscure except in transmitted light, with some transverse veins; upper glume slightly longer, linear, subacute, thinner, 3-nerved, ciliolate near the tips. Lower floret reduced to an oblong broadly truncate sub-2-nerved upwards ciliate valve, $2\frac{1}{2}$ lin. long. Upper floret as long as the lower: valve lanceolateoblong, narrowly truncate, obscurely mucronulate, 3-nerved, ciliolate near the tips. Anthers 2½ lin. long. Fertile spikelets linear, up to over 6 lin. long, including the pungent densely silvery-bearded callus, which is about 1½ lin. long. Glumes subequal: lower convolute, wingless, subcoriaceous, obtuse, glabrous or loosely hairy, 9-nerved, nerves very obscure except in transmitted light, upper slightly longer, linear, subobtuse, strongly 3-nerved, eciliolate. Lower floret reduced to an oblong truncate hyaline ciliate 2-nerved valve. Upper floret \(\): valve narrowly linear, hyaline and 3nerved below, cartilaginous above passing into a slender flexuous silvery-grev awn, 32-4 in. long, obscurely kneed, tightly twisted below, all the awns intertwisted on one side of the raceme, plumose with soft hairs up to over 1 lin. long, bristle with very short upwards decreasing hairs or merely hispidulous upwards.—T. polymorphus, var. Thollonii, Franch. in Bull. Soc. Hist. Nat. Autun, viii. 14 (of reprint), partly. T. Gouini, Bureau in Compt. Rend. Acad. Paris, c. iii. (1886); not of Fourn.

Lower Guinea. French Gaboon: M'pila plains near Brazzaville, Thollon, 92! 374! 393!

3. T. plumosus, Nees, Agrost, Bras. 344. Perennial, compactly cæspitose. Culms surrounded at the base by the firm persistent leaf-sheaths, up to over 4 ft. high, terete, glabrous, 4-5-noded, bearded below the nodes. Leaf-sheaths firm, terete, tight, the lower longer, the middle and upper much shorter than the internodes, glabrous or rarely (in the African specimens) sparingly hairy; ligules firmly scarious, from less than 1 lin. to up to over 2 lin. or occasionally over 1 in. long; blades narrow-linear, tapering to a long fine point, usually convolute-junciform or more or less flat, up to 1 ft. long and $\frac{3}{4}$ lin. wide, glabrous or hirsute at the base, midrib and the few primary lateral nerves rather prominent below. cemes solitary or 2-5-nate, 3-9 in. long, stiff or somewhat flexuous; rhachis subterete, glabrous except along the very oblique shortly bearded disarticulation marks, internodes about 2-2½ lin. long; longer pedicels very slender, up to 1 lin. long, glabrous or very sparingly

Sur

hairy, tips very oblique. Subsessile spikelets 3, rarely neuter, oblong to linear-oblong, 3\frac{3}{4} (rarely 5) lin. long, sparingly hairy to glabrous. Glumes subequal; lower firmly chartaceous, more or less convex on the back, very obtuse to truncate or obscurely 2-toothed, keels finely marginate and scabrid upwards, intracarinal nerves 7, very distinct upwards, with some transverse veins; upper glume slightly longer, linear to linear-oblong, acute, thinner, 3-nerved, margins softly ciliate. Lower floret reduced to a narrow linear to linear-oblong acute faintly 2-nerved ciliolate valve. Upper floret: valve similar to that of the lower floret, 2-toothed, sometimes mucronulate, 1-3-nerved, glabrous except the ciliolate teeth. Anthers up to $2\frac{1}{2}$ lin. long, tips minutely bearded. Fertile spikelets linear, $3\frac{1}{2}$ 4 in. long, with a sharply pointed bearded callus, about $1\frac{1}{2}$ lin. long. Glumes subequal; lower convolute, subcoriaceous, obtuse, ciliolate near the membranous reddish tips, more or less pubescent or glabrescent and then often shining, about 11-nerved, with a few transverse veins; upper slightly longer, linear, subobtuse, strongly 3-nerved, ciliolate above. Lower floret reduced to an oblong obtuse hyaline ciliate 2-nerved valve. Upper floret \(\) ∶ valve linear, hyaline and 3-nerved below, cartilaginous above, passing into a slender flexuous silvery-grey awn, $1\frac{1}{2}-2\frac{1}{2}$ (rarely over 3) in. long, more or less kneed at or below the middle with the column usually so tightly spirally twisted that the margins close up and the spirals become obscured, slightly plumose from soft hairs about 1 lin. long, the bristle pale and with gradually decreasing short hairs, or merely hispidulous upwards. Anthers up to 2½ lin. long. Stigmas up to 1 lin. long.—Nash in North Amer. Fl. xvii. 96. T. capensis, Trin. in Mém. Acad. Pétersb. 6me sér. ii. 257; Nees, Fl. Afr. Austr. 100: Pilg. in Engl. Jahrb. xxx. 268. T. truncatus, Anderss. in Ofvers. K. Vet. Akad. Förh. Stockh. 1857, 49. T. polymorphus, Eyles in Trans. Roy. Soc. S. Afr. v. 294. T. p., subvar. capensis, Hack. in DC. Monogr. Phan. vi. 326; Durand & Schinz, Consp. Fl. Afr. 701; and Études Fl. Congo, 314; Th. & Hél. Durand, Syll. Fl. Congol. 622; Stapf in Dyer, Fl. Cap vii. 331 (var.); var. truncatus, Hack. l.e. 327; Durand & Schinz, Consp. Fl. Afr. v. 702; var. Tholloni, Franch. in Bull. Soc. Hist. Nat. Autun, viii. 14 (of reprint), partly. Stipa capensis and S. spicata, Thunb. Prodr. 19-20; Fl. Cap., ed. Schult. 106, 107. Heteropogon truncatus, Nees, l.c. 102. Andropogon spicatus and A. truncatus, Steud. Syn. Pl. Glum. i. 368.

Lower Guinea. Belgian Congo: Cataracts District; Luteté, in dry sandy ground, 2000 ft., Hens, A. 222! Angola: Benguella; country of the Ganguellas and Ambuellas, Gossweiler, 2422!

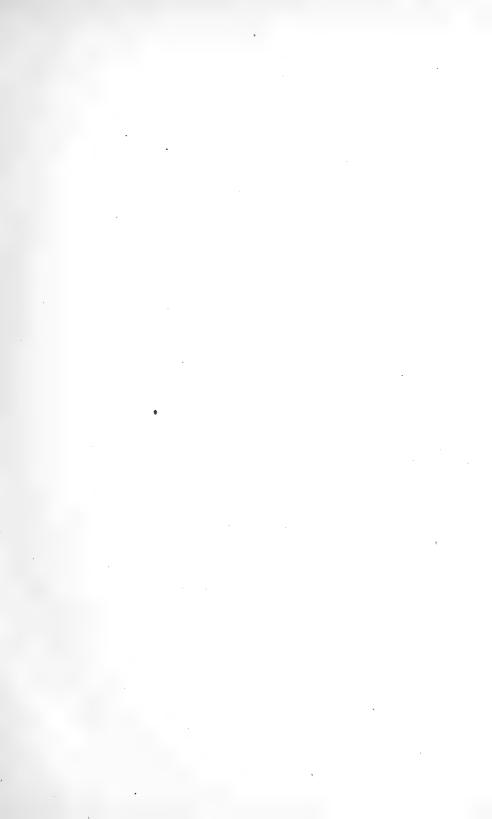
South Central. Belgian Congo: Katanga; Elisabethville, Rogers, 10963!

Mozambique Distr. German East Africa: Ubena, on laterite, 6000 ft.,

Goetze, 788! Rhodesia: Victoria, Monro, 907! Victoria Falls, Rogers, 5695*!

Salisbury District, Mundy! Gazaland, Swynnerton, 1657*! 1670*!

Also in South Africa, Madagascar and the hot parts of America from Texas and Arizona to the Argentine.





This polymorphic and apparently somewhat plastic species occurs in Africa in several forms of uncertain status, closely corresponding to analogous conditions in its American area (from Texas and Arizona to the Argentine). One form is vicarious of, if not identical with Trachypogon secundus, Scribn. (Heteropogon secundus, Presl) and represents, if of short stature and with short racemes $(2-3\frac{1}{2}$ in, long), the T. capensis of Trinius, whilst the other, taller and with 2-3 racemes, corresponds similarly to the original T. plumosus, Nees (Andropogon plumosus, H. B. & K.) which, first described from Venezuela, is now known to extend from Colombia and Trinidad southwards to beyond the tropic. However, I-racemed states have also been collected in Brazil, so that the areas of the two forms overlap there, provided that these 1-racemed states are not merely reduced conditions of the typically several-racemed T. plumosus. That such occur is evident from specimens with 1- and several-racemed culms on the same stock. Conversely, T. secundus and its African parallel may occasionally produce a second or third raceme when they become indistinguishable—at least in the herbarium—from the original T. plumosus. Another character, namely the length of the ligule (from 1-15 lin.), might be expected to indicate a specific differentiation; but it appears to be equally subject to fluctuation without any correlation to other characters or connection with the vigour of the individual or with geographical distribution. Thus, in the present state of our knowledge, practically nothing is left for taxonomic discrimination within this group. No attempt has therefore been made in this place to define varieties, but the specimens with more than I raceme per peduncle have been marked with an asterisk. The nomenclature of this species is controversial to some extent. Here, T. plumosus is extended so as to cover T. Montufari of Fournier (Mex. Gram. 65) and of Hitchcock (Mex. Grass, 198)—but not Andropogon Montufari, H. B. & K., which seems to deserve the rank of a distinct species— T. secundus of Scribner (U.S. Dept. Agric. Agrost. Circ. no. 32) and other American forms, and T. capensis, Trin.

4. T. durus, Stapf. Perennial, compactly caspitose. densely coated at the base with the firm persistent basal leaf-sheaths or their remains, up to over 3 ft. high, terete, glabrous except the upper ends of the internodes (either all or all but the lowest) which bear an annular beard of appressed hairs covering the contracted base of the sheath. Leaf-sheaths firm, terete, tight, produced at the mouth into short or obscure auricles, the intermediate and upper much shorter than the internodes, glabrous, smooth; ligules firm, very short to almost 1 lin. long, obtuse, adnate to the auricles of the sheath; blades junciform, convolute, wiry, rarely at length opening out, over 1 ft. long and under ½ lin. in diam., when flattened out under 1 lin. wide, glaucous-green, glabrous or shortly hairy or bearded behind the ligule, smooth, midrib very slender in the upper part of the upper side, stouter and more raised downwards, then flatter and much widened towards the base, quite obscure on the back, primary lateral nerves 1 or 2 on each side, prominent above. Racemes solitary, stiff, 4-5 in. long; rhachis terete, glabrous or very sparingly hairy, shortly bearded along the very oblique disarticulation marks, internodes $2\frac{1}{2}$ -3 lin. long; longer pedicels $2\frac{1}{2}$ -3 lin. long, glabrous or sparingly hairy. Subsessile spikelets of, narrowly linear-oblong, hardly widened upwards, 41 lin. long, loosely hairy in the lower part, at length quite glabrous. Glumes equal; lower coriaceous, convex on the back, obtuse, keels marginate or very narrowly winged upwards

and rigidly white-ciliolate towards the tips, intracarinal nerves 5-7, obscure downwards except in transmitted light, with some transverse veins; upper glume linear, subacute, thinner, 3-nerved, ciliate. Lower floret reduced to a linear-oblong truncate shortly ciliate faintly 2-nerved valve over 3 lin. long. Upper floret: valve linearsubulate with a ciliolate submucronulate tip. Fertile spikelets linear, 6 lin. long including the pungent very shortly and densely bearded callus which is 1½ lin. long. Glumes subequal; lower convolute, coriaceous, obtuse, rigidly ciliolate near the firmly scarious tip, more or less loosely hairy from the middle downwards, 9-nerved, nerves slightly raised in the tip, otherwise obscure except in transmitted light, upper very slightly longer, linear, very shortly subacute, ciliolate upwards. Lower floret as in the subsessile spikelet. Upper floret \(\zeta :\) valve linear, hyaline and 3-nerved towards the base, cartilaginous upwards, passing into a flexuous or more or less kneed pale brown awn 3-3; in. long, column twisted with the spirals gaping, plumose with soft white hairs up to 1 lin. long, the bristle pale with gradually decreasing short hairs or merely hispidulous upwards.

Lower Guinea. Angola: Benguella; in moist water-logged situations along the meadows of the Cuito River, Gossweiler, 3199!

5. T. planifolius, Stapf. Perennial, densely exspitose, 2 ft. high. Culms more or less coated with the remains of the basal leaf-sheaths. terete, 4-5-noded, glabrous except at the densely and appressedly white-bearded upper ends of the internodes, the hairs covering the slightly constricted sheath-bases. Leaf-sheaths firm, terete, those of the culm-leaves produced into narrow lanceolate acute auricles up to 3 lin. long, the middle and upper shorter than the internodes, glabrous or sparingly hirsute; ligules scarious, broadly rounded at the top, as long as or somewhat longer than the sheath-auricles and laterally adnate to them; blades linear, slightly narrowed towards the base, tapering to a fine point, 6-9 in. by 2-2½ lin., glaucousgreen, quite flat, erect, rigid, glabrous, rough on the face and margins, less so on the back, midrib slender, prominent below, flat and somewhat widened downwards on the face, lateral nerves numerous, close, the primary hardly differentiated. Racemes solitary, somewhat stiff, 4-6 in. long; rhachis slender, terete, sparingly hairy upwards, internodes 2 lin. long; pedicels 2 lin. long, more or less loosely hairy. Subsessile spikelets of or neuter, linearoblong to almost linear, 3½-4 lin. long, villosulous or pubescent all over, variously tinged with purple. Glumes subequal; lower firmly chartaceous, convex on the back to semiterete, narrowly truncate, keels marginate, rigidly ciliolate upwards, intracarinal nerves 6-7, obscure downwards with few transverse veins; upper glume slightly longer, linear, acute, ciliate. Lower floret reduced to a linear-oblong narrowly truncate ciliate faintly 2-nerved valve, 3½ lin. long. Upper floret: valve hyaline, linear, with a ciliolate





tip, or cartilaginous upwards with a short twisted bristle. Anthers 2 lin. long. Fertile spikelets linear, 4-4½ lin. long, including the subacute densely bearded callus which is \(\frac{3}{4}\) lin, long. Glumes subequal; lower convolute, chartaceous, truncate, obscurely ciliolate near the scarious tip, villosulous all over, intracarinal nerves 5 almost without transverse veins; upper very slightly longer, linear, subacute to almost obtuse, ciliolate upwards. Lower floret reduced to a linear-oblong truncate ciliolate 2-nerved hyaline valve as long as the lower glume. Upper floret \(\): valve linear, hyaline and 3-nerved towards the base, cartilaginous upwards, passing into a slender flexuous subgeniculate silvery-grey awn, up to $2\frac{1}{2}$ in. long, column with few very steep spirals so tightly screwed up as to look almost solid, subplumose downwards, hairs up to \frac{1}{2} lin. long, bristle very shortly hairy all along.

Mozambique Distr. German East Africa: Kyimbila, Stolz!

An imperfect specimen collected by Miss Johnstone (no. 165!) near Nairobi may belong here.

48A. ELYMANDRA, Stapf.

Spikelets 2-nate, those of the uppermost pair differing in sex and shape (forming with the pedicelled terminal spikelet a trio), those of the lower 5-6 pairs homogamous (alike in shape), one sessile, the other pedicelled on the rhachis of paired racemes, terminating the culms and their branches; homogamous pairs loosely disposed on the axis which is almost tough between them, but disarticulates readily above them. Raceme-pairs supported by a spatheole, collected into very loose and usually scanty spatheate panicles; the fertile spikelet falling with the adjacent pedicels; joints and pedicels of the homogamous pairs stoutly linear, glabrous or almost so, except at the ciliolate nodes of the axis (raceme-base); pedicels of the terminal trio very slender, ciliate. Florets 2, lower reduced to an empty valve, upper \bigvee in the sessile spikelet of the trio, \bigwedge , rarely neuter, in all the others. Fertile spikelets subterete, awned; callus moderately long, acute, shortly bearded. Glumes subequal, coriaceous, the lower quite keelless with an obtuse or truncate obscurely nerved tip, the upper acute, with a groove on each side of the rounded back, 3-nerved. Valves of lower floret hyaline, 2-nerved, of upper stipitiform with a long stout awn from between 2 short hyaline teeth. Valvule 0. Lodicules glabrous, small. Stamens 3. Stigmas laterally exserted; styles terminal. Grain unknown. Pedicelled spikelets (of all pairs) and homogamous sessile spikelets lanceolate, acuminate, the lower mucronate to aristulate; lower glume keelless with the margins narrowly involute. Valves of both florets developed or the upper suppressed.—An annual, somewhat coarse grass.

Species 1, endemic.

(Stopf)

1. E. androphila, Stapf. Annual, up to over 6 ft. high, a coarse grass with stout culms (Pobéquin). Culms terete, rather slender, glabrous and smooth in the upper part (base not seen). Upper culmleaves quite glabrous except for an occasional large beard of long fine hairs at the mouth of the sheaths, these terete, tight, shorter than the internodes, smooth; ligules membranous, truncate, ½ lin. long; blades narrowly linear from an equally wide base, very long-tapering to a fine point, up to almost 2 ft. by 2 lin., flat or with the margins revolute, glaucescent, scabrid along the margins, otherwise smooth or nearly so; midrib slender below, wider and whitish above, lateral nerves very close, about 3 primary on each side, prominent. Spatheate panicle very lax, up to 2 ft. long, of 4-5 very distant primary tiers, lowest tiers reduced to a single 2-noded compound tier over 1 ft. long, the following 4-5-rayed with (except upwards) one of the rays compound and often over \(\frac{3}{4}\) in. long, bearing a secondary tier of about 3 filiform simple rays, 3-4 in. long; lower subtending leaves resembling the preceding ones, the following rapidly becoming spatheoloid. Spatheoles narrow, long-attenuated to a setaceous point or with a short subulate blade and a beard at the junction with it, 3-4 in. long, more or less herbaceous when young, at length tightly inrolled; peduncles filiform, terminally or subterminally exserted from the spatheole, scaberulous or rigidly puberulous upwards. Racemes loose, $\frac{4}{5}$ - $1\frac{1}{2}$ in. long, greenish, the upper bare at the base for 8-10 lin.; joints of the base (between the homogamous pairs) linear-filiform, $\frac{3}{4}-1\frac{1}{2}$ lin. long, subglabrous except at the ciliolate nodes; pedicels of the homogamous pairs $1\frac{1}{2}$ —2 lin. long, glabrous, of the terminal trio 4–5 lin. long, densely ciliate on both sides. Fertile spikelets oblong, including the callus 5½ lin. long, dark olive-green or olive-brown to almost black, loosely and finely pubescent; callus ³/₄-1 lin. long, densely and shortly white-bearded. Lower glume 7nerved, nerves quite inconspicuous except when seen on the inner side. Lower floret reduced to a hyaline oblong obtuse reversedly ciliate sub-2-nerved valve. Upper floret \forall : valve stipitiform, minutely 2-dentate, $1\frac{1}{2}$ lin. long, glabrous; awn up to over 3 in. long, stout, kneed at and fulvo-hispidulous below the middle. Spikelets of the homogamous pairs and the pedicelled of the terminal trio alike, or sometimes neuter, lanceolate, acuminate, glabrous, $3\frac{1}{2}-4\frac{1}{2}$ lin. long; lower glume herbaceous-chartaceous, acute or more or less acuminate, often produced into a mucro or short bristle, many-nerved, nerves close and fine; upper glume slightly shorter, subhyaline, 3-nerved; lower valve equalling the preceding glume, hyaline, 1-nerved, reversedly ciliate; upper very narrowly linear, sparingly hairy or suppressed; anthers, if any, purple, 2 lin. long.— Andropogon androphilus, Stapf in Journ. de Bot. xix. 103; Pobéguin, Ess. Fl. Guin. Franç. 217.

Upper Guinea. French Guinea: Fouta Jallon; between Soumbalako and Boulish, Chevalier, 18631! Kouroussa, Pobéguin, 521! Timbo, Pobéguin, 1786! 1798!

Pleiadel phia Stapp (1927)

Pleiadel phia Stapp (1927)

Pleiadel phia Stapp (1927)

Aid Congo Portugues, Gosaw. 8739

much like Elymandra but,
racenies solutary; III & spikelet
with slender (decidnous) awn to 2 cm
long. see USIH.



Pobéguin's specimens from Timbo seem to represent a stout form with a much reduced inflorescence and slightly smaller spikelets, but they agree in all essentials with his Kouroussa plant. A very striking grass.

49. HOMOPOGON, Stapf in Mém. Soc. Bot. France, viii. 103.

Spikelets 2-nate (at least in the plan), one of each pair sessile, the other pedicelled (quite rudimentary in the lowest pair and the terminal trio and represented elsewhere by a short empty pedicel), on the fragile many-jointed rhachis of solitary racemes, terminating the culms and their upper branches; all the sessile spikelets alike and fertile (except that of the lowest pair which is more or less reduced), falling with the adjacent joint and pedicel; joints and pedicels linear-filiform, with very oblique tips, bearded below. Florets of the perfect spikelets 2, lower reduced to an empty valve, upper \u2202. Fertile spikelets terete or subterete, awned; callus pungent, fulvously bearded. Glumes equal; the lower coriaceous, involute, very narrowly inflexed and indistinctly keeled upwards, obscurely nerved; the upper with a deep longitudinal groove on each side, coriaceous between the grooves, 3-nerved. Valve of lower floret hyaline, 2-nerved, of upper floret stipitiform, hyaline and sub-3-nerved towards the base, cartilaginous upwards, passing into a slender geniculate awn. Valvule 0. Lodicules glabrous. Stamens unknown. Stigmas laterally exserted below the middle. Grain unknown.—An annual grass with narrow leaves and dense cylindric racemes.

Species 1, endemic.

1. H. Chevalieri, Stapf, l.c. Culms erect, slender, up to over 3 ft. high, 5-noded, glabrous, smooth, internodes (except the uppermost) long-exserted from their sheaths. Leaf-sheaths terete, tight, the lowest slightly hirsute, the others glabrous; ligules scarious, truncate, $\frac{3}{4}$ lin. long; blades linear, tapering to a very slender point, 4-12 in. long, $1\frac{1}{2}$ -2 lin. wide, flat, sparingly hairy below, closely and finely nerved, the uppermost subfiliform, up to 2 in. long. Racemes very shortly exserted from the supporting sheath, slender, $1\frac{3}{4}-3\frac{1}{2}$ in. long; joints up-to 20, about 2 lin. long; pedicels 1-1½ lin. long, slightly exceeded by the fulvous beard. Sessile spikelets including the callus 3 lin. long, chestnut-brown; callus 1 lin. long. Lower glume obtuse, glabrous, glossy, smooth except on the asperulous subterminal keels, nerves 7-9, more distinct in transmitted light; upper quite glabrous. Lower floret : valve over $1\frac{1}{2}$ lin. long, pubescent upwards. Upper floret: awn 2-3 in. long, kneed at or slightly above the middle, column dark, whitish pubescent, slender, bristle pale.

North Central. Upper Oubangui region: Mbrous country; basin of the upper Ombella, near Dati, Chevalier, 5761!

50. HETEROPOGON, Pers.; Benth. et Hook. f. Gen. Pl. iii. 1133.

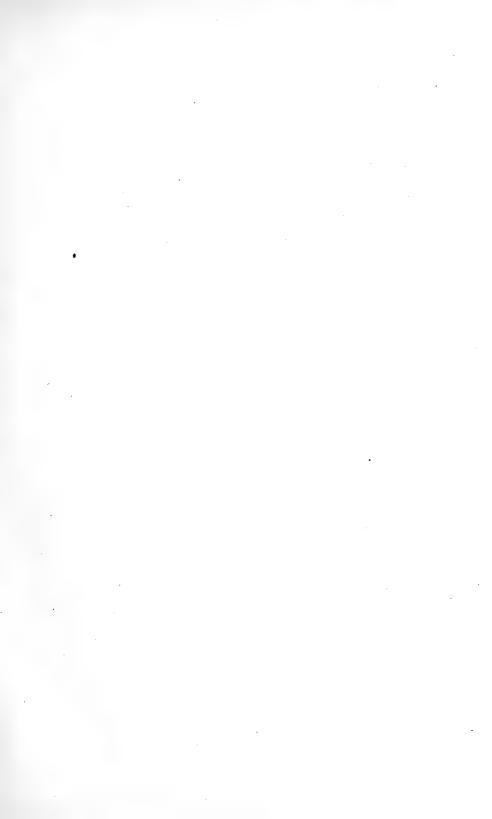
Spikelets 2-nate, those of the lower (1 to many) pairs alike in sex and shape, or neuter, of the upper pairs differing in sex and strikingly so in shape, one of each pair sessile, the other pedicelled on the many-jointed rhachis of solitary racemes, terminating the culms and their upper branches; rhachis tough or upwards tardily disarticulating and glabrous between the homogamous pairs, readily disarticulating above them; homogamous pairs long-persistent, the spikelets of the heterogamous pairs falling separately, the pedicelled with the pedicel, the sessile with the adjacent joint and the adjacent pedicel or its base. Florets 2, lower reduced to an empty valve, upper \(\sigma \) or \(\otimes \) in the sessile spikelets of the heterogamous pairs, or neuter in all the other spikelets. Fertile spikelet terete or subterete, awned; callus long, pungent, densely bearded upwards. Glumes equal; the lower coriaceous, rarely chartaceous, more or less tightly involute, quite keelless, nerves obscure, often connected by few transverse nerves in the upper part; the upper with a deep longitudinal groove on each side, coriaceous, rarely chartaceous, between them, thinner towards the margins, membranous at the tips, 3-nerved. Valve of lower floret hyaline, nerveless, of upper floret stipitiform from a hyaline very slender base, cartilaginous upwards and passing into a usually stout geniculate awn. Valvule small or 0. Lodicules large or more or less reduced, to very minute. Stamens 3, often rudimentary, or 0. Stigmas exserted terminally or laterally. Grain more or less linear in outline, subterete, slightly dorsally compressed; embryo somewhat exceeding the middle of the grain. Male (or neuter) spikelets dorsally flattened, usually slightly asymmetric, and often somewhat twisted, muticous, imbricate. Lower glume herbaceous, many-nerved, winged upwards from one or both keels; upper membranous, lanceolate-oblong, acute, 3-nerved. Valves hyaline, 1-nerved, well developed or more or less reduced. Stamens 3 or 0.—Perennial or annual grasses, with simple or more often upwards branched culms; branches few to many, mostly flowering and gathered into a spatheate panicle; racemes conspicuously dorsiventral, the bases of the 3 (or neuter) spikelets subimbricate on the back of the raceme, their upper parts bending forward around the sides, forming a hollow in which the fertile spikelets are enclosed, with their awns exserted anticously and often intertwisted.

Species about 4, in the tropical and subtropical regions of both hemispheres.

Perennial; leaf-sheaths conspicuously compressed and keeled; lower blades usually shortly acute to subobtuse; pedicelled spikelets oblong-lanceolate, subacute, 4–5 lin. long, their lower glume without a longitudinal median series of depressed glands 1.

... 1. H. contortus

Annual; leaf-sheaths terete or only slightly compressed; all the blades long-tapering to a fine point; pedicelled

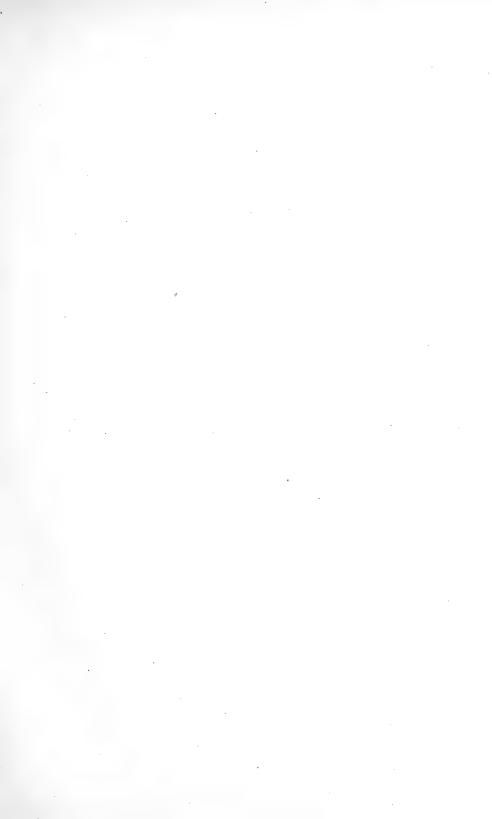




spikelets lanceolate, long-subulate-acuminate, 8-10 lin. long, with a longitudinal median series of depressed glands 2. H. melanocarpus.

1. H. contortus, Roem. & Schult. Syst. Veg. ii. 836. Perennial, cæspitose, up to over 3 ft. high, innovations extra- and intravaginal. Culms erect or geniculate-ascending, more or less compressed in the lower internodes, glabrous, smooth, quite simple or more often only for the first 3 or 4 internodes, then branched: lowest branches barren or mixed or like the following entering into the formation of a spatheate panicle. Leaves glaucous-pruinose; sheaths compressed, keeled, with the keels sometimes raised, quite glabrous, or with a few tubercle-based hairs at or towards the mouth, rarely ciliate on the upper margins, smooth; ligules short, truncate, ciliolate; blades linear from an equally wide base, acute or the lowest subacute to obtuse, the upper sometimes long-tapering to a fine point, 3-9 in. by $1\frac{1}{2}$ - $3\frac{1}{2}$ lin., folded in bud, then opening out and mostly quite flat, suberect and somewhat stiff, glabrous or with some tubercle-based hairs towards the base, particularly on the margins, the latter cartilaginous, slightly rough at least upwards, midrib slender, prominent below, primary lateral nerves 3-4 on each side, prominulous. Inflorescence consisting of a single terminal raceme or more often of several flowering branches, simple or divided from the base, forming tiers and collected into a scanty rarely copious and more or less fastigiate spatheate panicle; all or most of the rays simple (sometimes one or the other replaced by a leafy branch), slender, stiff, erect, from $1\frac{1}{2}$ to over 6 in. long (up to the insertion of the spatheole); subtending leaves like the preceding ones. narrow, long-tapering to an acute point, about 3-4 in. long, herbaceous to subherbaceous, glabrous, soon tightly inrolled; peduncle stoutly filiform, strict or slightly arched, usually subterminally exserted during flowering, then lengthening out and often exceeding the spatheole by more than 1 in. Racemes somewhat stout, 1-3 in. long, of 3-10 homogamous and frequently up to 12 heterogamous pairs; internodes of the tough portion of the raceme 2-1 lin. long, glabrous, of the fertile portion (joints) over 1 lin. long, the free part above the insertion of the sessile spikelet $\frac{1}{4}$ lin. long, slender, glabrous, with a very oblique tip, the part below (callus) completely fused with the base of the lower glume, subcvlindric, up to 1 lin. long, very acute to pungent (with a short oblique articulation-face), rufously ciliate on the sides, cilia increasing upwards and forming a dense beard concealing the joint and the base of the pedicel; pedicels glabrous, ½ lin. long, disarticulating at the base with a very oblique scar. Fertile spikelets cylindric, slender, 3-3\frac{1}{2} lin. long (excluding the callus), brown, at length very dark. Glumes equal, coriaceous; lower tightly involute, truncate, minutely pubescent or hirtellous, about 9-nerved, nerves slightly raised, very obscure in transmitted light, with a few transverse veins in the tips: upper glume narrowly

linear-oblong, subobtuse, sides much thinner than the hispidulous coriaceous very obtuse dorsal keel. Lower floret reduced to a linearoblong hyaline ciliolate nerveless valve, $1\frac{1}{2}$ lin. long. Upper floret \mathcal{Q} : valve stipitiform from a very slender hyaline base, cartilaginous above it and passing into a stout geniculate awn, 2 to over 4 in. long, column at length dark brown, shortly grevish-pubescent, somewhat longer than the paler bristle; valvule 0. Lodicules microscopic. Stamens 0 or reduced to microscopic rudiments. Stigmas exserted terminally. Grain linear, $1\frac{1}{2}$ - $1\frac{3}{4}$ lin. long, semiterete, grooved on the face, whitish. Male spikelets all alike or the lowest somewhat reduced, dorsally flattened, oblong-lanceolate, subacute, 4-5 lin. long, green, the sessile almost symmetric, the pedicelled somewhat asymmetric and contorted; glumes subequal, the lower herbaceous, closely many-nerved, glabrous or variously hairy, hairs tuberclebased, few or many in a single row along the margin, or spread over a marginal zone or all over and then sometimes long, rigid and spreading, keels more or less unequally winged upwards, inflexed flaps very narrow; upper glume membranous, acute, 3-nerved, ciliate upwards; valves linear-oblanceolate, hyaline, 1-nerved, ciliolate, of the lower floret $3-3\frac{1}{2}$ lin., and obtuse, of the upper slightly shorter, narrower, acute; lodicules small; anthers 1½ lin. long.—Nees in Linnæa, vii. 284, and Fl. Afr. Austr. 101; Webb in Hook. Niger Fl. 190; Benth. Fl. Austral. vii. 517; Duthie, Fodd. Grass. N. Ind. 32, Ill. t. 19; Maiden, Us. Pl. Austral, 90; Stapf in Kew Bulletin, 1907, 211; Burtt-Davy in Ann. Transvaal Mus. ii. 129; Nash in North Amer. Fl. xvii. 128. H. hirtus, Pers. Syn. ii. 533; Balf. f. Bot. Socotra, 316; Rendle, Cat. Afr. Pl. Welw. ii. 153 (includ. var. glaber). H. glaber, Pers. l.c.; Beauv. Agrost. 134, t. 23, fig. 8. H. hirsutus, Beauv. l.c. 134. H. Allionii, Roem. & Schult. I.c. 835; Nees, Gen. Fl. Germ. Monocot. i. t. 94; Reichenb. Icon. Fl. Germ, i. t. 53, fig. 1496-7. H. polystachyus, Nees, Agrost. Bras. 364; Peters, Reise Mossamb, Bot. 563. H. Roxburghii, Walk.-Arn. ex Nees, in Nov. Act. Nat. Cur. xix. Suppl. i. 183. H. messanensis, Guss. l.c. H. Hohenackeri, Hochst. ex Mig. Anal. H. hispidissimus, Hochst. ex Steud. Syn. Pl. Bot. Ind. ii. 24. Glum. i. 367. H. besukiensis, Miq. Fl. Ind. Bat. iii. 494. Andropogon contortus, Linn. Sp. Pl. ed. i. 1045; Lam. Ill. t. 840; All. Fl. Pedem. ii. 260, t. 91, fig. 4; Kunth, Enum. i. 486; Steud. Syn. Pl. Glum. i. 367; A. Rich. Tent. Fl. Abyss. ii. 453; Baker, Fl. Maurit. 444; Hack. in Bolet. Soc. Brot. iii. 137, and v. 213, and in DC. Monogr. Phan. vi. 585 (incl. all the varieties), and in Bull. Herb. Boiss. iv. App. iii. 11; Klatt in Jahrb. Hamb. Wiss. Anst. ix. 121; Engl. Hochgebirgsfl. Trop. Afr. 113; Glied. Veg. Usambara, 35; Pflanzenw. Afr. i. 566, fig. 502; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 13 and 93; Durand & Schinz, Consp. Fl. Afr. v. 709; K. Schum. in Engl. Pfl. Ost-Afr. C. 98; Franch. in Bull. Soc. Hist. Nat. Autun, viii. 27 (of reprint); Hook, f. Fl. Brit, Ind. vii. 199; Chiov. in Ann.





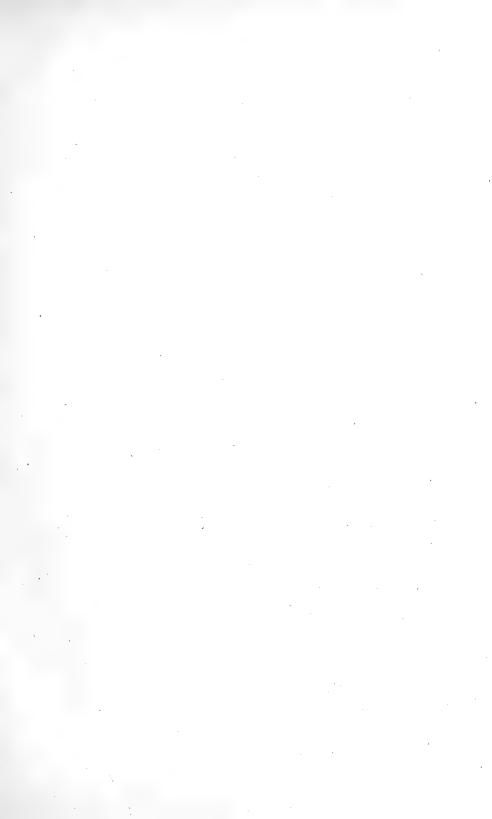
Istit. Bot. Roma vii. 61, and viii. 25 and 284–285; Stapf in Dyer, Fl. Cap. vii. 350; De Wild. & Durand, Reliq. Dewevr. 254; De Wild. Études Fl. Bas- et Moyen-Congo, ii. 9; Wood, Natal Pl. t. 121; Th. & Hél. Durand, Syll. Fl. Congol. 624; Pilg. in Engl. Pflanzenw. Afr. ii. 156, fig. 116 B, and in Mildbr. Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. ii. 43; Eyles in Trans. Roy. Soc. S. Afr. v. 295. A. secundus, Willd. ex Nees, Agrost. Bras. 364; not of Kunth. A. firmus, J. S. Presl in C. B. Presl, Rel. Haenk. i. 334. A. firmus, Kunth, Enum. i. 486. A. messanensis, Bivona ex Guss. Fl. Sic. i. 164. A. besukiensis, Steud. in Zoll. Syst. Verz. ii. 59. A. Bellardii, Bubani in Nuov. Giorn. Bot. v. 317. A. Hohenackeri, Hochst., and A. hispidissimus, Hochst. ex Hack. in DC. l.c. 587.

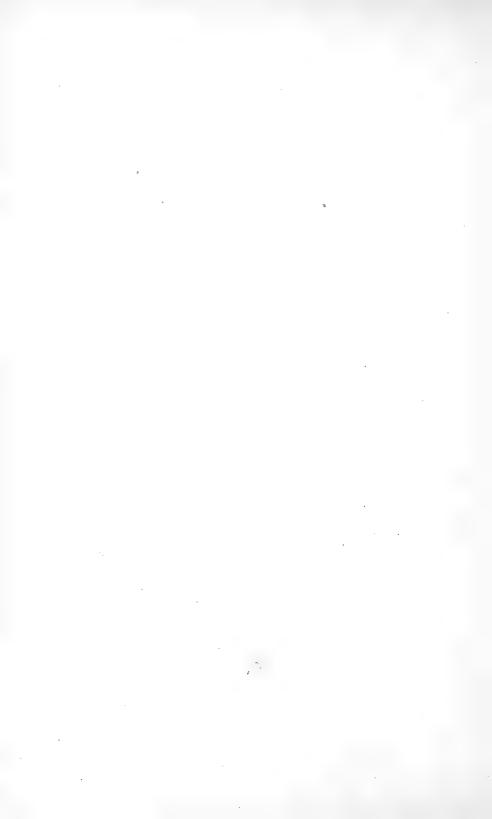
Common throughout the whole of Tropical Africa, and the adjacent islands, ascending in Eritrea to over 8800 ft. As it is quite unmistakable, it is unnecessary to enumerate the very many specimens examined. A good fodder grass when young, but very troublesome to man and beast and even dangerous to the latter when mature on account of the sharply pointed calli of the fertile spikelets which penetrate the skin and the membranes of the mouth; hence the name "spear-grass." Hackel (in DC. Monogr. Phan. vi. 586–588) distinguishes two varieties and 6 subvarieties according to the degree of hairiness or the reverse of the male spikelets and the degree of ramification of the culms; but the inconstancy of these characters is so evident that it is not worth while to discriminate between the forms corresponding to them.

The species extends all over Africa, the Mediterranean region, and the tropical and subtropical regions generally.

2. H. melanocarpus, Benth. in Journ. Linn. Soc. Bot. xix. 71. Annual, up to over 6 ft. high. Culms erect, stout, often with stiltroots from the lowest nodes, terete, glabrous, smooth, simple and 4-6-noded below the paniele or occasionally with 1 or 2 mixed branches from the intermediate nodes. Leaves green; sheaths slightly compressed and more or less keeled to terete, tight or at length rather loose, glabrous, smooth, with impressed glands on the keel; ligules short, scarious, rotundate, glabrous; blades linear, moderately attenuated towards the base, long-tapering to a fine point, $\frac{1}{2}$ to over $1\frac{1}{2}$ ft. by 2–5 lin., folded with one margin inflexed in bud, then more or less flat, suberect, somewhat stiff or flexuous, glabrous except at the frequently long-ciliate base, rough on both sides (particularly on the upper) and along the margins, midrib slender, becoming stouter towards the base, whitish above, primary lateral nerves 3-5 on each side, prominent, with numerous fine secondary nerves between them. Inflorescence a spatheate panicle of very varying composition, containing few to very many racemes, in more robust plants up to over 1 ft, long and more or less interrupted, occasionally augmented by 1 or several mixed branches; primary internodes few, the lowest up to over 8 in. long, the following rapidly decreasing; lower tiers few-rayed, the following up to 6-rayed, fastigiate, innermost ray sometimes compound and bearing

a secondary up to 6-rayed tier; ultimate (simple) rays stoutly filiform, 2 to less than 1 in. long; lowest subtending leaves like the preceding ones, the following becoming rapidly spathaceous with short blades. Spatheoles very narrow, very long-tapering to a slender point, from over 5 to 3 in. long, herbaceous to subherbaceous, glabrous, usually with impressed glands on the middle nerve or keel; peduncle short during flowering, then lengthening out and sometimes only slightly shorter than the spatheole, filiform, appressedly hairy upwards. Racemes stout, compressed-cylindrical, 1-1½ in. long, with 1-3 homogamous and up to 5 heterogamous pairs; internodes of the tough portion of the rhachis under 1 lin, long, glabrous: of the fertile portion (joints) up to over 1\frac{1}{2} lin. long, the free upper part \(\frac{1}{2}\)-\frac{3}{4}\) lin. long, widened upwards, obliquely truncate, whitish, glabrous, the part below (callus) as in H. contortus, 1 lin. long; pedicels glabrous, 1 lin. long, disarticulating below the middle. Fertile spikelets linear-oblong, terete to subterete, $3\frac{1}{4}-3\frac{3}{4}$ lin. long (excluding the callus), brown, at length very dark. Glumes equal, coriaceous: lower tightly involute, truncate, minutely and fulvously hirtellous, 7-9-nerved, nerves very fine, faintly visible in transmitted light with very few transverse nerves in the tips; upper glume narrowly linear-oblong, subobtuse, glabrous or nearly so. Lower floret reduced to an oblong hyaline eciliate nerveless valve, $1\frac{1}{4}$ lin. long. Upper floret \mathcal{Q} or \mathcal{Q} : valve as in H. contortus, 3-5 in. long; valvule lanceolate, hyaline, nerveless, not quite 1 lin. long. Lodicules broad-cuneate, fleshy, $\frac{1}{2} - \frac{3}{4}$ lin. long. Stamens 3; filaments not much longer than the ovary; anthers oblong, purple, \frac{1}{2} lin. long or more or less reduced or the stamens quite suppressed. Stigmas exserted from the middle of the spikelet or higher up. Grain linearoblong in outline, subterete, 3 lin. long, whitish. Male (or neuter) spikelets unequal, green, glabrous, the sessile of the homogamous pairs symmetrical, linear, acute, about 6 lin. long, their lower glume subherbaceous, very closely and finely nerved between the slightly scaberulous keels, inflexed margins equal, very narrow; upper glume slightly shorter, membranous, with 3 green nerves, ciliate upwards: valves and stamens small, rudimentary; the pedicelled of all pairs somewhat asymmetric, lanceolate, subulate-acuminate, 8-10 lin. long. usually more or less contorted; glumes very unequal, lower herbaceous, very closely and finely nerved, with a narrowly winged keel and a fine inflexed flap on one side, and with a keelless involute margin on the other, scrobiculate along a median zone; upper glume as in the sessile homogamous spikelets; valve of lower floret oblong, obtuse, up to over 4 lin. long, 1-nerved, ciliate, of upper floret linear, very narrow, up to 2 lin. long, nerveless, ciliate or both valves more or less (often much) reduced; lodicules up to \frac{1}{2} lin. long; anthers up to $2\frac{1}{4}$ lin. long or rudimentary.—Nash in North Amer. Fl. xvii. 127. H. acuminatus, Trin. in Mém. Acad. Pétersb. 6me sér. ii. 254; Rendle in Cat. Afr. Pl. Welw. ii. 153. H. Roylei, Nees in Steud. Syn. Glum.





i. 367. H. polystictus, Hochst. in Flora, 1856, 28. H. scrobiculatus, Fourn. Gram. Mex. 64. Stipa melanocarpa, Muhl. Descr. Uber. Gram. 183. Cymbopogon melanocarpus, Spreng. Syst. i. 289. Andropogon melanocarpus, Elliott, Sketch Bot. S. Carol. i. 146; Hack. in DC. Monogr. Phan. vi. 584; Durand & Schinz, Consp. Fl. Afr. v. 717. A. scrobiculatus, Kunth, Enum. i. 507. A. polystichus, Hochst. ex Steud. l.c. 369. Trachypogon scrobiculatus, Nees, Agrost. Bras. 347.

Nile Land. Abyssinia: Jelajeranne, Schimper, 2012.

Lower Guinea. Angola: Pungo Andongo; sandy woods by the River Cuanza between Mopopo and Sansamanda, Welwitsch, 7388! Amboland: Upingtonia, Schinz.

Mozambique Distr. Rhodesia: without precise locality, Mundy!

Widely spread throughout the hot countries of both hemispheres; probably of American origin.

51. **THEMEDA**, Forsk.

Spikelets 2-nate (the terminal 3-nate), those of the lower 2 pairs alike in shape and sex, or neuter, sessile to subsessile and closely approximate so as to form an involucre, of the following pair or pairs differing in sex and conspicuously so in shape, one of each pair sessile, the other pedicelled, on the rhachis of solitary racemes, terminating the culms and their upper branches; rhachis terete, tough or tardily disarticulating and glabrous between the homogamous pairs, readily disarticulating below the fertile spikelets; homogamous pairs or at least their sessile members persistent, the spikelets of the heterogamous pairs falling separately, the pedicelled with the pedicel, the sessile with the adjacent joint (if more than 1) and the base or bases of the adjacent pedicels. Florets 2, lower reduced to an empty valve, upper 3 or neuter in the homogamous spikelets and the pedicelled members of the heterogamous pairs, & in the sessile members of the latter. Fertile spikelets terete, awned or awnless; callus usually acute to pungent, densely bearded, beard more or less concealing the adjacent joint or pedicel-bases. Glumes equal, coriaceous except at the submembranous tips; lower tightly involute, quite keelless, nerves very fine, obscure except in transmitted light, the upper with a deep longitudinal groove on each side, very firm between them, thin along the margins, 3-nerved. Valve of lower floret hyaline, nerveless, of upper floret stipitiform from a hyaline 1-nerved base, cartilaginous upwards and passing into a stout geniculate awn or hyaline and 1-nerved throughout with the nerve becoming stouter upwards and passing into a more or less reduced awn or quite awnless. Valvule hyaline, nerveless, small or 0. Lodicules 2, somewhat large, glabrous. Stamens 3. Stigmas exserted subterminally or from near the middle of the floret. Grain linear-obovate, subterete, grooved on the face; embryo about half as long as the grain. Involucral spikelets dorsally much compressed, awnless. Lower glume more or less herbaceous, 2-keeled;

upper membranous, very rarely suppressed. Both florets present or one or both suppressed: their valves hyaline, the upper with or without a valvule. Pedicelled spikelets of the heterogamous pairs similar to those of the homogamous pairs, but narrower.—Annual or perennial, usually coarse grasses, with scanty or compound to decompound spatheate panicles and scattered or more or less crowded and often glomerate short 1- or 2- (very rarely 3-) awned or awnless monostachva.

Species about 15-16, all natives of the tropical and subtropical region of the Old World, mostly Indo-Malayan.

Perennial; involucral spikelets 4-7 lin. long, glabrous or

more or less irregularly beset with tubercle-based hairs 1. T. triandra.

Annual; involucral spikelets 2½-3½ lin. long, always with a row of rigid bristles along the flexures near the tips,

the bristles springing from coarse pale tubercles ... 2. T. quadrivalvis.

1. T. triandra, Forsk. Fl. Ægypt.-Arab. exxiii. and 178. Perennial, 13-4 ft. high, densely compitose, often with a short coat of fibres (the withered remains of the basal sheaths) at the base, innovations intravaginal. Culms somewhat slender, glabrous (very rarely softly hairy), with or without a glaucous bloom below the nodes, terete or more often slightly compressed downwards, erect or geniculateascending, few- to many-noded below the panicle, often with short barren branches, forming bunches of leaves, from the lower and intermediate nodes. Leaf-sheaths more or less compressed and keeled, particularly the lowest, the upper terete, tight, much shorter than the internodes, glabrous, more rarely and usually sparingly hairy, very rarely bearded at the nodes; ligules scarious, ciliolate, truncate, very short, $\frac{1}{3}$ lin. long; blades firm, folded in bud, then flat, linear from an equally wide or slightly wider and somewhat rounded clasping base, those of the basal leaves and the innovations short, 2-3 in. by $1-2\frac{1}{2}$ lin., shortly tapering, acute or subacute or like the others elongated and long-tapering to a slender point, those of the culm-leaves up to over 6 (rarely over 12) in. long, mostly 1-2, occasionally 3 or even 4 lin. wide, green or more or less glaucous to very glaucous, glabrous or sparingly hairy towards or fimbriate at the base, rarely loosely hairy all over, hairs soft or somewhat stiff, usually from a small tubercle, midrib slender, primary lateral nerves 2-5 on each side, very slender. Spatheate panicle narrow, erect, from a few inches to over $1\frac{1}{2}$ ft. long; primary internodes 2-6, if more than 2 or 3, then the lowest much elongated (up to 10 in. and even more), the intermediate rapidly shorter, the uppermost very short; lowest branches often undivided at the base with a long slender basal internode and 2-3 approximate few-rayed tiers, the following forming tiers of 2-5 rays, all these tiers except the uppermost mixed; compound rays of the lower tiers up to 4 in. long, of the upper rapidly shorter, rarely more than 2-noded, filiform, often flexuous or nodding, simple rays of lower tiers often over 2 in. long,





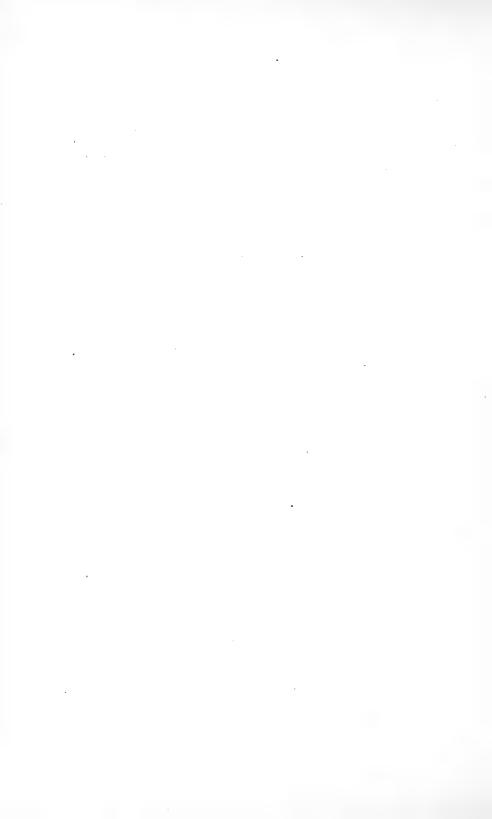
of the upper and uppermost often 4-5, very short—hence their monostachya crowded into obovoid heads—dorsally flattened, scantily ciliate or bearded towards the tips; the degree of division of the panicle very variable, heads therefore from few to many, if many scattered in the lower, approximate in the upper part of the panicle and its main branches; lower subtending leaves like the preceding leaves; upper with a green or purple-tinged spathaceous sheath passing imperceptibly into a linear acute blade, tapering upwards, including it from 6 to under 2 in. long, glabrous or more or less hairy, uppermost quite spatheoloid. Spatheoles compressed cymbiform, lanceolate, long-acuminate, glabrous or more or less hairy, often suffused with purple or violet, up to 2 in. long, herbaceous except at the scarious margins and tips, the inner of large heads shorter (to less than 1 in.) and more scarious; peduncles rarely up to 1 lin. long. Racemes normally with a single fertile spikelet. Fertile spikelet including the callus 2½-3 lin. long, rarely slightly shorter, awned; callus pungent, to over 1 lin. long, densely rufously bearded. Lower glume rigidly and minutely puberulous towards the obtuse tips, otherwise glabrous and shining, whitish when in flower, at length dark chestnut-brown, 7-9-nerved, nerves more or less anastomosing below the nerveless tip; upper glabrous, with a few transverse nerves upwards. Lower floret: valve delicate, lanceolate, acute, about 2 lin. long. Upper floret \u225: awn usually between 1½ and 2½ in. long (rarely shorter in the tropical African specimens), kneed at or near the middle, column dark brown, hirtellous, bristle paler. Anthers up to over 1 lin. long. Involucral spikelets inserted almost at the same level, oblong-lanceolate to linearoblong, 4-6 lin. long, rarely shorter or longer, persistent; glumes equal or subequal; lower acute or acuminate with a fine point, produced at the base into a callous swelling, closely nerved, green to glaucous, often tinged with purple, at length of a rich straw-colour or russet, quite glabrous or more or less hairy, particularly in the upper part, rarely all over, hairs fine, spreading, 1-1½ lin. long, springing from a small pale or dark (sometimes black) tubercle, rarely hairs and tubercles coarser, one of the keels usually with a very narrow scarious wing or margin; upper 3-nerved; valve of lower floret linearlanceolate, acute, up to 4 lin. long, 1-nerved, of upper floret very narrow, more or less reduced, sometimes very small or suppressed; anthers 2 lin. long. Pedicelled spikelets linear- to subulate-lanceolate with a fine point, always quite glabrous, usually J.-Schweinf. in Bull. Herb. Boiss. ii. Append. ii. 16, 95: K. Schum. in Engl. Pfl. Ost-Afr. A. 51; Rendle in Cat. Afr. Pl. Welw. ii. 161; Pilg. in Engl. Pflanzenw. Afr. ii. 151, fig. 114, and in Mildbr. Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. ii. 45; Eyles in Trans. Roy. Soc. S. Afr. v. 298. T. Forskalii, Hack, in DC. Monogr. Phan. vi. 659 (partly); Durand & Schinz, Consp. Fl. Afr. v. 731 (incl. most varieties); K. Schum. l.c. A. 23, 56, 79; Engl. Hochgebirgsfl.

Trop. Afr. 115; Glied. Veg. Usambara, 23, 40; Chiov. in Ann. Istit. Bot. Roma, vii. 61, and viii. 27, 290; Batt. & Trab. Fl. Anal. Algér. et Tunis, 355; Stapf in Kew Bulletin, 1907, 212; Pilg. in Engl. Pflanzenw. Afr. ii. 119. T. Forskalii, var. glauca, Cheval. Sudania, 36; Th. & Hél. Durand, Syll. Fl. Congol. 627. T. qlauca, Batt. & Trab. Fl. Algér. Monoc. 128. T. imberbis, T. Cooke, Fl. Bombay, ii. 993. Anthistiria imberbis, Retz. Obs. iii. 11; Desf. in Journ. de Phys. xl. 293, t. 1; Thunb. Fl. Cap. i. 402, ed. Schult. 107; Kunth, Enum. i. 481; Steud. Syn. Pl. Glum. i. 401; Stapf in Dyer, Fl. Cap. vii. 366; Wood, Natal Pl. ii. t. 133; Burtt Davy in Transvaal Agric. Journ. iii. 287, t. 52. A. glauca, Desf. Fl. Atlant. ii. 380, t. 254; Coss. & Durieu, Expl. Scient. Algér. ii. 52. A. Desfontainii, Kunth, Rév. Gram. i. 161. A. ciliata, Nees in Linnea, vii. 284 (var. β), and in Fl. Afr. Austr. 121; Anderss. in Peters, Reise Mossamb, Bot. 562; Oliv. in Trans. Linn. Soc. xxix. 176: Dewèvre in Comptes-Rendus Soc. Bot. Belg. xxxiii. 108; not of Linn. f. A. ciliata, v. Burchellii, Hack. in Bolet. Soc. Brot. iii. 139. A. arguens, Nees, Fl. Afr. Austr. 124; not of Willd. A. punctata, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 448. A. paleacea, Ball in Journ. Linn. Soc. Bot. xvi. 734. A. vulgaris, Hack. in Engl. & Prantl, Pflanzenfam. ii. Abt. 2, 29. Stipa arguens, Thunb. Prodr. 20; not of Linn. Calamina imberbis, Roem. & Schult. Syst. ii. 810.

The name Themeda triandra, Forsk., (1775), has been used here instead of T. Forskalii, Hack. (1889), as there is no doubt that the type of Forskal's species, which apparently has been lost, was one of the forms covered by the description given above (see Schweinfurth in Bull. Herb. Boiss. ii. App. ii. 16). The species, as defined here, is, however, taken in a sense somewhat narrower than Hackel's; this restriction requires a short explanation. Hackel in his monograph of the Andropogoneæ distinguishes 11 varieties and as many subvarieties or forms within his T. Forskalii, whilst other authors have at various times described more than a dozen species, all of which come within the compass. There can be no doubt as to the close affinity of these forms and the question of their status is mainly one of expediency. A careful examination of the large amount of material at Kew and the British Museum has led to the conclusion that for the present it will be most useful to detach, firstly, those forms that are fairly uniform, and at the same time exclusive, over a targe area; and secondly, those that, though of a limited range, stand out from the remainder by some character or characters. This leaves a residuum much less homogeneous than any of the segregates just referred to. It consists apparently of more or less fixed races, mutants, hybrids and edaphic forms which from herbarium material are the less separable because they are to a high degree independent of geographical areas. At the same time, however, they are all African with an extension into Arabia, Syria and the south-eastern corner of Asia Minor, and, taken as a whole, represent practically the African share of Hackel's T. Forskalii. It is to this aggregate that the description and synonymy given above apply. The forms distinguished here have long been recognized and received proper names. They are briefly characterized below. The first is the most common. To avoid overloading the text with letters, the specimens referable to it are not marked; and the remainder have added to them the Greek letter, or in the case of intermediate forms letters which precede the name in the following synopsis of varieties.

a hispida. Not conspicuously glaucous in any part, frequently quite green; leaves glabrous or—particularly their sheaths and blade-bases—sparingly





hairy; spathes (towards the margins) and involucral spikelets or at least the latter moderately to very sparingly hispid, or if more densely so then the hairs

stiff; hair-tubercles pale; lateral spatheoles nearly always glabrous.

This includes the Anthistiria ciliata, hispida, Nees (Fl. Afr. Austr. 121) but not A. hispida, Thunb., which is Tristachya leucothrix, Trin. The only African specimen referred by Hackel to his var. major—the remainder are Sino-Japanese and Indian plants—belongs here (Dschadscha, Abyssinia, Schimper). A form microstachya—with involueral spikelets $3\frac{1}{2}$ — $4\frac{1}{2}$ lin. long, and a form macrostachya—with spikelets up to $6\frac{1}{2}$ lin. long and awns up to 3 in. long, mark the extremes between which this form fluctuates. Common also in South Africa. β punctata. Like the preceding, but the spathes, spatheoles, and involucral spikelets with copious and somewhat soft hairs which spring from small dark to jet-black tubercles. No form microstachya has been observed so far in this group. Distributed by Schimper as Anthistiria punctata and described under that name by A. Richard.

γ Burchellii. As to colour like the preceding, but glabrous in all parts; W.r. involucial glumes $4-6\frac{1}{2}$ lin. long, awn from 2 to over 3 in. long. This is Hackel's variety Burchellii from Griqualand West. Also in Orange Free State, Transvaal and Natal and in a state approaching punctata (with scanty black-tubercled

hairs) in Madagascar. Very near the Australian T. australis.

 δ glauca. All parts conspicuously glaucous and glabrous; involucial spikelets from 4 to over 6 lin. long, awns $2-2\frac{1}{2}$ in. long. This is Forskal's original

T. triandra from Yemen. It is also the predominant form in Algeria.

A form $(\delta : \alpha : \beta)$ which might be described as a rather glaucous link between vars. hispida and punctata was described by Boissier (Diagn. Pl. Or. ser. i. fase. 13, 72) as Anthistiria syriaca and subsequently as A. ciliata, y syriaca (Fl. Or. v. 460), from Syrian specimens. Chevalier's specimens of T. triandra from the upper Niger basin belong here. Another form $(\alpha : \delta, microstachya)$ is Boissier's Anthistiria ciliata, var. brachyantha (Fl. Or. l.c. A. brachyantha, Boiss. Diagn. 1.c. 71). The only Tropical African specimen comparable with it comes from Usambara (Holst, 8741). Retz's Anthistiria imberbis approaches var. Burchellii and var. hispida, f. microstachya, very closely. It differs from the former in its lower stature, short involucial spikelets (4-5 lin.) and awns ($1\frac{1}{4}-1\frac{2}{3}$ in.) and the frequent presence of 1-3 rarely more tubercle-based stiff hairs near the tips of the lower glume of the involucral spikelets, from the latter mainly in its low growth and the scarcity or absence of tubercle-based hairs on the involucral spikelets. It is rather uniform throughout a wide area in the West and South of Cape Colony, mingling occasionally with var. hispida, but replaced by it and by var. Burchellii in the Eastern and North-eastern parts of South Africa.

Upper Guinea. French Guinea: Fouta Jellon; between Timbo and Diting, $(\delta:\alpha:\beta)$ Chevalier, 18503! French Sudan; San $(\delta:\alpha:\beta)$, Chevalier, 2362! Nile Land. Eritrea: Mensa; Geleb, (3) Schweinfurth, 1407; Rora Ualicaue, 6250 ft., Pappi & Terracciano, 2037, 2039, 2072. Amasen; Amara plateau, 7200 ft., (β) Schweinfurth, 628, Tellini, 387, (β) Pappi, 2173; Lesa Mountains, Pappi, 4625, 4706, 4732, 4894; Addi Nefas, Pappi, 4157, 4164; Mountains, Pappi, 4625, 4706, 4732, 4894; Addi Nefas, Pappi, 4157, 4164; Mount Bizen, gregarious in open grassland, 6250 ft., Schweinfurth & Riva, 2026! Ambelaco, near Maldi, 6550 ft., Schweinfurth, 99; Saganeiti, (β) Schweinfurth, 1742, Micheletti, 126; Dembelas; upper reaches of the Leito-Barka, forming turf, 7200 ft., Schweinfurth, 27. Maragus; Koheito plateau, 8500 ft., Schweinfurth, 28, 29. Assaorta; Mount Urug, 4900 ft., Pappi, 3377; Mount Dyot, 4000-6000 ft., (β) Pappi, 578; Ocule Cusai; Soyra Mountains, 9200-9850 ft., Pappi, 1270; Sarae; Gaza-Gobo, 5900-6550 ft., Pappi, 210. Abyssinia: Tigre; Mount Scholoda, (β) Schimper, 73! Amba Sea, 6000-9000 ft., (β) Schimper, 1054! Memsah, (β) Quartin Dillon; Simen; near Dochli, (β) Schimper, 1555! Jaja, 6000 ft., Schimper, 383! and without precise locality, (β) Schimper, 360! Boran Country; Lake Harimiya, (β) Drake-Brockmann, 25! and without precise locality, Stordu! British Somali-Drake-Brockmann, 25! and without precise locality, Stordy! British Somaliland: Dara-as, (β) $Miss\ Cole!$ and without precise locality, (approaching δ) Lort-Phillips! Socotra: above Kischen, (a: 8, f. microstachya) Schweinfurth,

581! Uganda: Ruwenzori; Kasamaga, 5300 ft., Scott Elliot, 7618! very common, especially on moist volcanic soil, 6000 ft., (γ) Scott Elliot, 6131! Mau, 9000 ft., (3) Battiscombe, 284! and without precise locality, Maitland, 66 A.B.! British East Africa: Naivasha to Baringo, (β) Gregory! Nairobi (f. microstachya), Lyne, 147! (β) Linton, 2! 15! Dowson, 242! (β) Powell, 11! (α: β) Kassner, 964! Tana river basin, (β) Gregory! Athi Plains, (β) Gregory!

Lower Guinea. Angola: Pungo Andongo; damp meadows near Sansamanda, Welwitsch, 2785! near Lombe and Quibinda, Welwitsch, 2839! Huilla; very scarce in wooded meadows near Monino, $(\gamma:\delta)$ Welwitsch, 2701! Humpata, (γ) Newton, 82! common near Huilla Mission Station, (f. macrostachya) (γ) Newton, 82! Pearson, 2712! Country of the Ganguellas and Benguellas, Gossweiler, 2419!

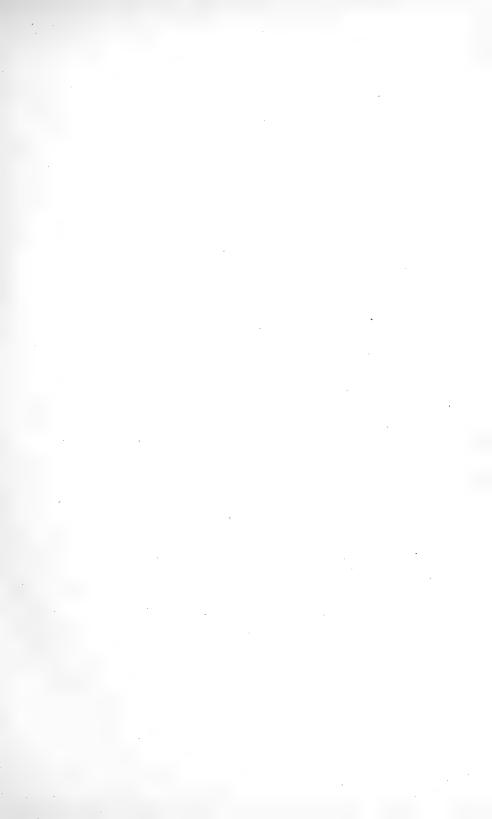
Damaraland (γ: δ, f. macrostachya) Eyles, 217!

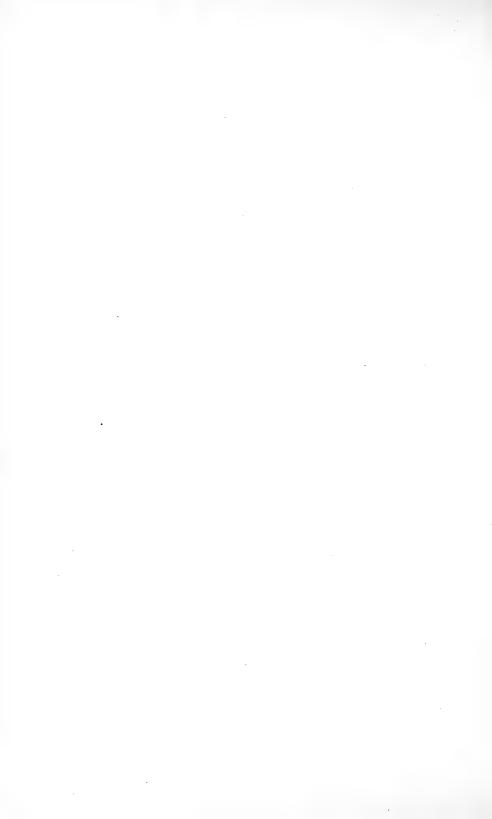
South Central. Belgian Congo: Ruzizi-Kivu Division, (according to Th. & Hél. Durand). Katanga; Chisangwe, Homblé, 43! (β) Homblé, 37!

Mozambique Distr. German East Africa: Tanga, Holst, 2129! Usambara; Mascheua, $(\gamma:\delta, f.\ microstachya)\ Holst$, 8741! Kwa-Mshuza, $(f.\ microstachya)$? Holst, 9155! and without precise locality, Buchvald, 516! Kilimanjaro; Kwa Ngowe, (β) Volkens, 351! Lake Jalla, (f. microstachya) Volkens, 303! Marangu, (β) Volkens, 1481! Unyamwezi; in rich low ground, growing luxuriantly, 3000 ft., Speke & Grant! Karagwe, Speke & Grant, 417! Rovuma River, (γ) Kirk! and without precise locality, (γ) Busse, 1139! Rovuma River, (γ) Kirk! and without precise locality, (γ) Busse, 1139! Nyasaland: Shire Highlands, Buchanan, 12! Blantyre. Descamps! Zomba, 4000-6000 ft., (f. macrostachya) Whyte! Manganja Hills, 3000 ft., (approaching β) Kirk! Tanganyika plateau, at Fort Hill, 3500-4000 ft., Whyte! slopes of Mwanemba Mountain, 4500 ft., McClounie, 23! Namasi, (approaching β) Cameron, 19! Rhodesia; Bulawayo, (γ:δ) Rogers, 5903! 13596! (δ?) Jeffreys, 39! Mashonaland; common, (γ, f. macrostachya) Allen, 703! Inyanga District, (δ: γ, f. macrostachya) Mundy! Umtali, Sawer, 36! Salisbury District, (f. macrostachya) Mundy! (δ: γ, f. macrostachya) Mrs. Craster, 26! Nobbs, 607! (γ) 631! (f. macrostachya) 636! Mazoe, (δ: γ, f. macrostachya) Eyles, 217! Chirinda, 3500 ft., Swynnerton, 1638! Nyahodi River, 4000 ft., Swynnerton, 1677! Portuguese East Africa: Umhlanhlow, on the lower Buzi river. (γ: δ) Swmmerton. 1571! Umhlanhlow, on the lower Buzi river, $(\gamma : \delta)$ Swynnerton, 1571!

One of the commonest grasses of the drier regions of Africa, often forming extensive associations. It is the Rooi grass of South Africa and like its Australian representative Themeda australia. Stapf (Anthistiria australia, R. Br.), a most valuable fodder grass (see Transvaal Agric. Journ. iii. 287, and Medley Wood, Natal Plants, ii. t. 133).

2. T. quadrivalvis, O. Kuntze, Rev. Gen. Pl. ii. 794. Annual. Culms erect or more often geniculate-ascending with stilt roots from the lower nodes, slender to stout (almost 3 lin. in diam.), terete, glabrous, often glaucous-pruinose below the nodes, 5-7-noded and simple below the panicle or here and there with additional flowering branches from the lower nodes, sometimes trailing among shrubs and other plants and then frequently many feet long. Leaf-sheaths compressed and keeled (the lowest) or terete, tight and much shorter than the internodes (the upper of the culms), glabrous, smooth; ligules membranous, glabrous, rounded, about 1 lin. long; blades somewhat flaccid, folded in bud, soon flat, linear from a slightly rounded base, shortly acute, particularly the lower, or more or less tapering to a slender point, the basal short, the intermediate up to 1 ft. long by 2-3 lin., green or slightly glaucous, glabrous on both sides or sparingly fimbriate with long fine tubercle-based hairs





towards the base, finely rough above or smooth all over except on the scabrid and upwards often spinulously ciliolate margins: midrib slender, primary lateral nerves very fine, 3-4 on each side. Spatheate panicle leafy, erect, or more or less nodding, from 6 in. (in meagre specimens) to over 2 ft. long, in robust specimens decompound to the third degree; primary internodes few to over 9, if numerous the lower much elongated, the intermediate rapidly shorter, the upper very short (10-15 lin.); lowest branches sometimes undivided at the base with a more or less elongated basal internode or more usually like the following forming tiers of up to 5 rays, all these tiers except the uppermost mixed; compound rays of the lower tiers from over 6 in. to 2 in. long, often nodding, the longest with up to 8 secondary tiers, the lowest of these secondary tiers frequently with a short 1-2noded compound ray bearing 1 or 2 tertiary few-rayed tiers; all simple rays filiform, somewhat compressed, glabrous or shortly bearded at the tips, short and usually enclosed in the sheath of the supporting leaf or spathe, those of the ultimate tiers about 3 lin. long, hence the monostachya crowded into dense apparently sessile heads, scattered or more or less closely approximate along the longer branches and the upper part of the primary axis of the panicle; degree of division of the panicle very variable according to the vigour of the plant; subtending leaves of all tiers distinctly differentiated into sheath and blade, the sheaths rapidly shortening upwards (down to 6-4 lin.), relatively broad, compressed, keeled, more or less herbaceous, often with a few tubercle-based stiff hairs near the mouth, blades always conspicuously longer than the sheath, linear, tapering almost from the base, very acute, somewhat rigid, often sparingly fimbriate at the base, keeled, the keel and the margins sharply scabrid. Spatheoles compressed, cymbiform, lanceolate, caudateacuminate, glabrous, more or less scarious with subhyaline margins, 8-6 lin. long, turning reddish; peduncles usually under \(\frac{2}{3} \) lin. long, glabrous. Racemes with a single fertile spikelet. Fertile spikelet including the callus 2 lin. long, awned; callus very short, obtuse, densely and shortly rufously bearded. Lower glume rigidly and minutely puberulous all over except at the membranous obtuse tip, at length dark brown, very faintly 7-9-nerved; upper glabrous, ciliolate. Lower floret: valve delicate, ovate-lanceolate, acute, $1\frac{1}{2}$ lin. long. Upper floret 2: awn about $1\frac{1}{2}$ in. long, slender, flexuous, more or less distinctly kneed at the middle, often bent again below it, brown, paler upwards, column very finely hirtellous. Anthers $\frac{2}{3}$ lin. long. Involucial spikelets inserted at almost the same level, oblong, up to $2\frac{1}{2}$ lin. long, persistent; glumes equal, lower acute with a fine point, produced at the base into a minute swelling, closely nerved, green, at length straw-colour, quite glabrous apart from a few (4-6) long submarginal tubercle-based bristles near the tip, one margin narrowly involute, the other very narrowly inflexed, the corresponding keel with a membranous margin or very

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narrow wing; upper glume 3-nerved; valves oblong, subobtuse, 1-nerved to nerveless, more or less reduced; anthers often rudimentary or 0. Pedicelled spikelets linear-subulate with a fine point, glabrous, neuter; lower glume many-nerved, upper shorter, 3-nerved, ciliolate; valves 0.—T. ciliata, Hack. in DC. Monogr. Phan. vi. 664; De Wild. & Durand, Rel. Dewevr. 255. Anthistiria, Linn. f. Diss. Nov. Gram. Gen. 38, t. 1, and in Amœn. Acad. (ed. Schreb.), x. Diss. Bot. 38, t. 1.—A. ciliata, Linn. f. Suppl. 113; Gærtn. Fruct. ii. 465, t. 175; Lam. Illustr. t. 841, fig. 1; Beauv. Agrost. t. 23, f. 7; Kunth, Enum. i. 481; Steud. Syn. Pl. Glum. i. 401; Baker, Fl. Maurit. 448; Balf. f. Bot. Socotra, 317 (partly); Hook. f. Fl. Brit. India, vii. 213; Stapf in Dyer, Fl. Cap. vii. 368. A. scandens, Roxb. Fl. Ind. ed. Carey, i. 248; Nees, Fl. Afr. Austr. 125: Duthie, Fodd. Gr. N. W. India, t. 61.—A. semiberbis. Nees, I.c.

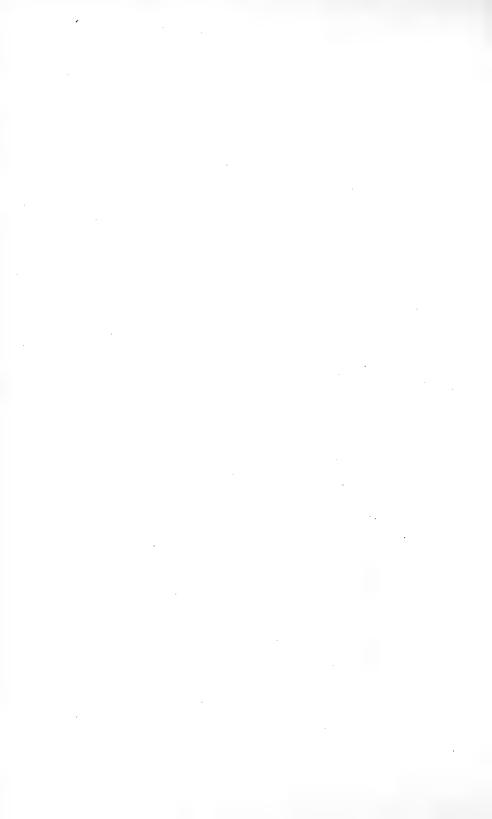
Nile Land. Socotra, Balfour, 239! Lower Guinea. Belgian Congo: Boma District; Shinganga, Dewèvre. A native of India: introduced elsewhere. Used for fodder in India.

52. DIGITARIA, Hall.

Spikelets lanceolate to elliptic-oblong, flat or more or less concave in front, convex on the back, falling entire from the pedicels, usually 2-3- (more rarely 4-6-)nate, secund and abaxial (see explanation below) on the triguetrous or flat rhachis of slender to very slender spiciform racemes; lower floret barren, reduced to the valve and a very minute rudimentary valvule, accompanied by equally minute lodicules; upper floret usually equal or subequal to the lower, \omega. Glumes very dissimilar, the lower a minute membranous scale or a very delicate readily disintegrating hyaline membrane, or sometimes quite suppressed, upper membranous, sometimes very thin, as long as the fertile floret to whose back it is appressed, or shorter to very short, 5- or more often 3-nerved, very rarely 1-nerved or almost nerveless, or 0. Barren floret: valve sometimes resembling the upper glume, but generally larger and determining the outline and size of the spikelet, 7-5-nerved; very rarely 3-nerved or reduced to a small scale, nerves parallel, prominent if not obscured by hairs. Fertile floret: valve chartaceous to subchartaceous with thin hyaline margins, faintly 3-nerved; valvule equal or subequal to the valve, embraced by it all along, finely 2-nerved, of the same texture. Lodicules 2, minute, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted near the top of the floret. Grain tightly enclosed by the slightly hardened valve and pale, oblong, dorsally more or less compressed, plano-convex in crosssection with rounded sides; hilum subbasal, punctiform; embryo usually less than half the length of the grain.—Perennial or annual, very rarely suffrutescent; blades linear to linear-lanceolate, usually flat and often more or less flaccid; ligules membranous; racemes

Ser. Bigitaria 1 186 pl. ango.

See Henrard Blumes Val 1934.



sessile, digitate or more or less distant on a common axis, sometimes bare at the base owing to the arrest of spikelets, rarely truly peduncled and panicled, simple or sometimes compound near the base; rhachis triquetrous, lateral angles with narrow green margins or herbaceous wings or flattened with a terete midrib; pedicels unequally long; spikelets closely appressed and more or less imbricate or lax to very lax, usually silky though often apparently glabrous owing to the very tight application of the extremely fine hairs, rarely really glabrous.—Panicum § Digitaria, Benth. et Hook. f. Gen. Pl. iii. 1101.

Species over 100, in the warm parts of both hemispheres, most numerous in

the Old World.

Haller (*Hist. Stirp.* ii. 244, 1768) was the first to give a full and correct description of the genus as here understood and is therefore accepted as its author. The usual quotation "Digitaria, Heist. ex Adanson" (Fam. Pl. ii. 38; 1763) is inadmissible in this place, as Adanson meant by it Tripsacum, L., whatever Heister's notion of Digitaria may have been. Scopoli (Fl. Carn. i. 52: 1772) and Wiggers (Prim. Fl. Hols. 6: 1780) took the genus from Haller; Wiggers adding a short differential diagnosis. Syntherisma, Walt., established in

1788, rests on an American species of Digitaria.

The nature of the hairs of the spikelets is remarkably varied and the several types of hairs which can be distinguished are so correlated with other characters suggesting close affinity that they may be treated as reliable guides to the main groups of species. Unfortunately the hairs are frequently so delicate (a very few micromillimeters in diameter) that a compound microscope is required to see the details of their structure. It has therefore been considered desirable in drawing up the key to support them as far as possible by less microscopic characters, although they may not always be of the same precision or constancy. Where the hairs are very fine and at the same time closely appressed to the valve they may become practically invisible even with the use of an ordinary lens. They can, however, always be detected if the spikelet is soaked and the surface rubbed with a needle from the tip downwards, or if examined under a higher power. The nervation of the upper glume and barren valve, another character of technical importance, is frequently obscured by the indumentum, but can generally be seen sufficiently clearly on the inner glabrous face of those organs after they have been flattened out in a drop of water. The all but constant presence of a very much reduced dorsally papillose valvule and of apparently functioning lodicules in the barren floret is a very interesting fact and a good generic character, but the parts are too minute and too similar to afford a practical means for specific discrimination. The valve and valvule of the upper floret are so similar in consistency and colouring that no attempt has been made to describe them separately, and the corresponding characters attributed to the floret are meant to cover both.

Here and in all the genera of Panicastra where the terms "spikelets abaxial" and "spikelets adaxial" are used, "abaxial" signifies that the face of the spikelet with the lower glume at the base and the valve of the upper floret (glumes i. and iii. of authors) above it are turned away from the rhachis, while "adaxial" means that the face of the spikelet faces the rhachis. Applied to the back of the fruit (see key to genera, p. 14), the terms have, of course, to be reversed; the back of the fruit of an adaxial spikelet is abaxial, and the

back of an abaxial spikelet is adaxial.

KEY TO THE SECTIONS AND SUBSECTIONS.

*Spikelets mostly hairy, although frequently apparently glabrous, not accompanied by white setulæ of equal or greater length; barren valve 7-, or more rarely 5-nerved

I. Eu-Digitaria.

Il Same for horza

†Racemes sessile or subsessile, sometimes bare at the base, but then always with traces of arrested spikelets.

Rhachis of racemes trigonous, laterally winged or margined (see also 35, D. angolensis).

Upper glume 3-nerved, rather different in shape

and size from the barren valve. Hairs fine to very fine, smooth-walled, with their tips straight, equally wide or slightly

wider upwards and obtuse or tapering to a sharp point, rarely abruptly capitellate (14, D. capitipila), always very many

times longer than wide.

Lower glume generally quite distinct, though small, an ovate membranous scale, persistent if at all developed; pedicels 2-nate (sometimes 3-4-nate towards the base of the raceme in 4, D. nodosa); hairs very fine, equally wide and thinwalled throughout, blunt or subacute, sometimes mixed with or replaced by fine stiff yellowish bristles which spread ... (a) SANGUINALES. at maturity; perennial or annual

Lower glume an extremely delicate hyaline colourless mostly truncate and crenulate or lobulate membrane disintegrating early or altogether suppressed; pedicels 2-6-nate, sometimes mixed with very short secondary branchlets in the lower

part of the raceme.

... (b) MONODACTYLÆ. Racemes solitary; perennial

Racemes 2 to ∞ .

Indumentum of spikelets short, appressed and often scanty or obscure, pale tawny, consisting of hairs firmer than in the Sanguinales with often slightly widened or abruptly ... (c) CALVULÆ. capitellate tips; perennial

Indumentum of spikelets longer, appressed (at least before maturity, after it sometimes spreading) and usually copious along the sides, produced beyond the tips of the spikelets into a short or long pointed tuft, often purplish or bronze colour, consisting of somewhat firm, very

acute hairs; perennial or annual ... (d) TRICHACHNE.

Hairs if any (see 24, D. Iburua) very short with obtuse clavate tips, or somewhat longer with very acute clavate tips, appressed, forming a delicately furfuraceous indumentum; pedicels angular and scabrid with usually hispidulous tips; annual ...

... (e) CLAVIPILÆ.

Upper glume 5-nerved, as long as and generally similar to the barren valve which is, however, 7-nerved; hairs if any (see 29, D. abyssinica) extremely fine, equally wide throughout, smooth-walled with curled tips; perennial or annual

... (f) CIRRIPILÆ.



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Rhachis of racemes usually flat with a rounded smooth midrib on the face and more or less terete smooth discoid-tipped pedicels, rarely (35, D. angolensis) trigonous with scaberulous pedicels; upper glume as long as the spikelet, 5-3-nerved, hairs of spikelets if any (see 38, D. exilis) conspicuously verrucose, very fine; annual (g) Verrucipilæ.

††Racemes genuinely peduncled; that is, with a bare terete filiform base without arrested spikelets. Racemes in 1 whorl (rarely 2), very long, ultimately

horizontally spreading with long plumose peduncles and very distant pairs of spikelets; suffrutescent

Racemes in open or contracted panicles; peduncles fine, glabrous, moderately long

**Spikelets quite glabrous, accompanied by white setulæ of equal or greater length from the tips of the pedicels; lower glume normally suppressed, upper reduced to a small scale or also suppressed; barren valve 3-1-nerved; racemes simple or downwards compound in open or contracted rarely almost spiciform panicles ...

(h) PENNATÆ.

(i) FLACCIDULÆ.

II. Setariopsis.

I. Eu-Digitaria.

(a) SANGUINALES.

*Perennial.

Racemes digitate or subdigitate, fastigiate, blades mostly narrow (up to 2 lin.) or if wider (2, D. milanjiana) then rather firm.

Racemes dense; rhachis narrowly winged, $\frac{1}{5} - \frac{1}{2}$ lin.

wide.

Spikelets subimbricate, acute, mostly distinctly silky, coloured, nerves of the barren valve smooth; compactly caspitose with silky tomentose bases (cataphylls and persistent sheath-bases), blades usually 1-2, rarely 3 lin. wide

Spikelets densely imbricate, acutely acuminate, glabrous (at least apparently) or rigidly ciliate, nerves rough; loosely cæspitose, often stoloniferous; stolons with thin strongly nerved appressedly hairy or glabrescent cataphylls; blades up to 5 lin. wide

Racemes more or less loose; rhachis marginate, ¹/₈-¹/₄ lin. wide; spikelets very loosely appressed

or spreading.

Spikelets rather dark, brownish or purplishgreen, apparently glabrous or obscurely silky on the sides; barren valve rather firm, prominently nerved; culms rather bare at the

Spikelets very pale, distinctly silky; barren

valve very thin.

Spikelets loosely appressed, hairs mostly appressed, obscuring the side-nerves; culms coated at the base with the remains of comentose cataphylls and sheaths

1. D. eriantha.

2. D. milanjiana.

3. D. seriata.

... 4. D. nodosa.

* Spikelets very loose, on spreading pedicels, with long fringes of hairs	5.	D.	[phara. macroble-
Racemes solitary or in pairs or false whorls on arther long and slender common axis, more or less stiffly spreading; pairs of spikelets rather scattered, apparently glabrous; blades thin, flaceid, up to 5 in. by 7 lin.	6.	D.	Pearsonii.
**Annual.			
Racemes in a succession of 6 or more whorls or false whorls on a slender common axis $2\frac{1}{2}-1$ in. long, bare and loosely plumose at the base; pairs of spikelets rather scattered; blades thin, flaccid, $4-9 \lim$ wide	7.	D.	$Perrottetii. \ \ $
Racemes digitate or subdigitate or if on a more elongated common axis then not in a regular succession of whorls and not plumose at the base. Spikelets acute or acuminate with smooth nerves. Spikelets \(^3_4-1\) lin. long; rhachis \(^1_4-\)\frac{1}{5}\ lin. wide, frequently with some long spreading very fine glistening hairs; blades thin, flaccid, 2-6 lin.			
wide	8.	D.	horizontalis.
Spikelets $1-1\frac{1}{2}$ lin. long; rhachis $\frac{2}{6}-\frac{1}{5}$ lin. wide, without long spreading hairs; racemes $2-6$ in. long; blades slightly firmer and on the whole narrower $(2-4$ lin.)	9.	D.	$mar m{g} in at a.$
Hairs of spikelets more or less appressed, white or silvery			var. Linkii.
Hairs of spikelets often accompanied by yellowish bristles, both spreading at maturity into rigid fringes			[ata. var, fimbri-
Hairs of spikelets 0			var. nubica.
Spikelets with a very acute often curved acumen and			
rough nerves, $\tilde{\mathbf{I}} - 1\frac{1}{2}$ lin, long; racemes 6-8 in. long, stiff	10.	D.	[tissima acumina-
(b) Mayon convert			
Only species	11.	D.	monodactyla
() ()			
(c) CALVULÆ.			
Spikelets over 1 lin. long, 2-4-nate, rather loosely arranged, their upper glume equalling three-quarters to the full length of the fertile floret, but leaving the sides uncovered; racemes rarely over 5 in. long; rhachis trigonous throughout.			
Common axis of racemes short; spikelets 1½ lin. long, the tips of their hairs not abruptly globose. Leaf-blades at length unrolling, up to 2 lin. wide;			
culms compressed	12.	D.	compressa.
Leaf-blades setaceous, $\frac{1}{4} - \frac{1}{3}$ lin. in diam.; culms terete	13.	D_{\cdot}	nardifolia
Common axis long with the racemes racemosely arranged; spikelets up to $1\frac{3}{4}$ lin. long, the tip of their hairs abruptly globose, resembling the heads		70	•,• •,
of pins	14.	D.	саригриа.

11+ 12 1 2 2 4 1



Spikelets up to 1 lin. long, 2-6-nate, dense, more or	less	1	
imbricate, their upper glume about half as long as			
fertile floret, covering it very imperfectly; race	emes		
5-9 in, long; rhachis trigonous and marginate at	$^{ m t}$ the		
base only, upwards flattened and winged	• • •	15.	D. seminuda.

(d) TRICHACHNE.

	(w) Interacting.	.74
Culms up to 6 ft. blades tightly co over 1 ft. by	e of hairs purplish or silvery. high, 2-noded, nodes glal producte, at length unrolling lin. (flattened out); pr	orous; , up to edicels
flat, 2-5 in. by 1	2–4-noded, nodes bearded; $\frac{1}{2}$ – $3\frac{1}{2}$ lin.; pedicels terete, s	moeth
purplish lateral fr	long, with a copious silve ringe of hairs; blades flat, 2 cels terete, scaberulous	2-6 in.
shorter, ultimate spreading. Nodes bearded, see	long, with the fringe of ely bronze-colour to rufous condary branchlets of panic	s and ele 3–6

(rarely 15) lin. long, fascicled with 2-4 simple pedicels; spikelets with lateral fringes of hairs ... 19. D. Lecardii.

Nodes glabrous; secondary branchlets 0 or only at the very base and quite short; spikelets with one transverse and two lateral fringes of hairs ... 20. D. xanthotricha.

(e) CLAVIPILÆ.

Spikelets hairy; fertile floret early darkening and vividly contrasting with the rest of the spikelet. Hairs of spikelet very short, obtusely clavate; barren valve 5-nerved; pedicels with distinctly hispidulous or minutely bearded tips. Rhachis of racemes $\frac{1}{4} - \frac{1}{2}$ lin. wide; spikelets 1 lin. 21. D. ternata. ... Rhachis of racemes $\frac{1}{5} - \frac{1}{3}$ lin. wide; spikelets $\frac{2}{3}$ lin. ... 22. D. melanochila. *** • • • Hairs of spikelets elongate, with very acute clavate tips; barren valve 7-nerved, the submarginal nerve very faint; pedicels with scabrid or scaberulous ... 13. D. delicatula. Spikelets glabrous; barren valve 7-nerved; fertile floret darkening late

(f) Cirripilæ.

... 24. D. Iburua.

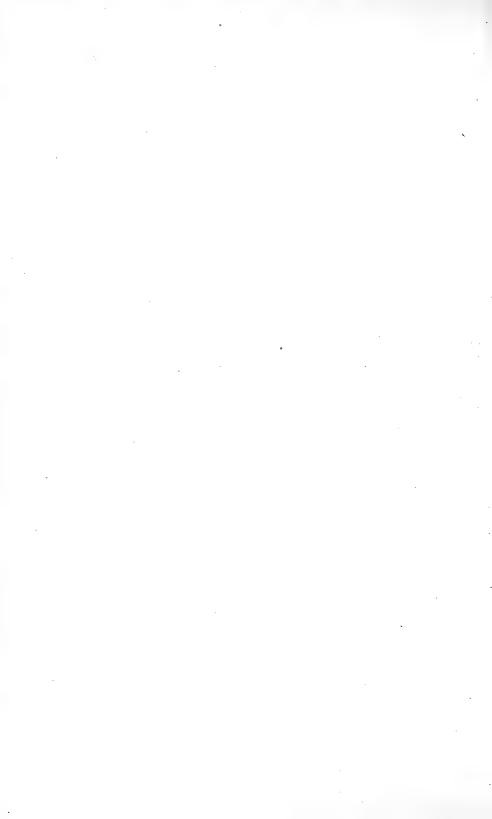
Perennial.

Spikelets hairy.

Racemes racemosely arranged, much shorter than the common axis and more or less appressed to it; spikelets 1\frac{1}{4} lin. long ... 25. D. botryostachya.

Racemes digitate or subdigitate, or if on an elongated common axis then longer than it and more or less fastigiate; spikelets \(\frac{3}{4}\)-1 lin. long. Nodes bearded; cataphylls and basal sheaths tomentose or villous; racemes numerous, mostly 7-10. Compactly exspitose, without stolons; culms		
2-3-noded; leaves glabrous or sparingly hairy except on the lower sheaths	26.	D. gazensis.
Forming tufts of barren shoots mixed with flowering shoots and trailing runners; culms many-noded, leaves more or less villous	27.	D. Chevalieri.
Nodes glabrous, 7 or more; racemes 2-5; stolon- iferous, with glabrescent cataphylls; leaves sparingly hairy	28.	D. Hackelii.
Spikelets glabrous, somewhat turgid; racemes 2-9, digitate or subracemosely arranged with the lowest longer than the common axis, oblique; rhizome long, creeping	29.	D. abyssinica.
Annual. Spikelets oblong to lanceolate-oblong, acute, up to 1 lin. long. Nodes bearded.		
Spikelets 1 lin. long, whitish with silvery lines of hairs; racemes 8-15, the lowest usually bare at the base	30.	$D.\ leptorrhach is.$
Spikelets $\frac{2}{3} - \frac{3}{4}$ lin. long, greenish or purplish, apparently glabrous; racemes usually over 20, bearing perfect spikelets from the base	31.	$D.\ polybotrya.$
Nodes glabrous; spikelets not quite 1 lin. long, greenish or brownish, apparently glabrous	32.	D. nigritiana
Spikelets lanceolate, finely or almost caudate- acuminate from the upper glume, 1-1½ lin. long, apparently quite glabrous	33.	$D.\ debilis.$
(g) VERRUCIPILÆ.		
Lower glume a broad white or blue hyaline cuff-like persistent scale, equalling a quarter of the spikelet; long-trailing, with short rigid lanceolate blades	34.	D. maniculata.
Lower glume very minute, delicate and fugitive or 0. Spikelets subacute to acuminate, but never aristulate. Spikelets hairy.		
Rhachis of racemes trigonous, up to $\frac{1}{4}$ lin. wide, with scaberulous angles; spikelets oblong, acute to subacute, over 1 lin. long, whitish-silky	35.	D. angolensis.
Rhachis of racemes flat, winged, with a terete smooth midrib.		
Spikelets oblong-lanceolate, acuminate, up to over 1 lin. long, silkily shaggy from long hairs which are produced beyond the tip of the		
spikelet	36,	D. argyrotricha
l lin. long, appressedly silky from short hairs Spikelets glabrous, elliptic-oblong, acute		
Spinorous grantous, empure-oniong, active	90,	4. Checos,





Spikelets aristulate from the fertile floret, oblong-lanceolate; spikelets apparently glabrous or the hairs spreading at maturity 39. D. aristulata.

(h) Pennatæ.

Only species 40. D. pennata.

(i) FLACCIDULÆ.

Spikelets oblong-lanceolate, acute to acuminate, 13/4 lin. long, pale, slightly whitish silky and shortly bearded from the base 41. D. nitens.

Spikelets lanceolate, acutely acuminate, $1\frac{1}{2}$ lin. long, green tinged with purple, dark purplish-silky ... 42. D. elegans.

II. Setariopsis.

perennial 45. D. Myurus Upper glume 0; barren valve small, 1-nerved; annual 46. D. intecta.

1. D. eriantha, Steud. in Flora, 1829, 468. Perennial, compactly cæspitose on a short stout præmorse rhizome; innovations intravaginal. Culms erect or subgeniculate, rather stout, 12-3 ft. high, glabrous, 2-4-noded, usually simple, sometimes scantily branched below. Leaf-sheaths rather loose, striate. the upper shorter than the internodes, glabrous, more rarely the lower more or less hirsute, the lowest like the cataphylls of the innovations silky-tomentose at the base, long-persistent and densely coating the shoots; ligules scarious, 1-2 lin. long, glabrous; blades linear, tapering to a fine point, 1-1 ft. by 1-2 lin., or the lowest much shorter, flat or with the margins revolute, rigid, glaucous, glabrous or scantily hirsute at the base, margins scabrid upwards, primary lateral nerves numerous, very fine and close. Racemes 4 to many, sessile, digitate or subdigitate with a usually stout and angular common rhachis up to over 1 in. long, erect or suberect, 4-8 in. long, strict or somewhat flexuous, dense, sometimes interrupted near the base, greyish-green or purplish; rhachis slender, $\frac{1}{4}$ lin. wide, trigonous, angles marginate or very narrowly winged, scabrid; pedicels 2-nate, filiform, more or less angular, scaberulous, unequal, the longer 1 lin., rarely up to $1\frac{1}{2}$ lin., long. Spikelets subappressed, subimbricate, oblong- or ovate-lanceolate, $1\frac{1}{4}-1\frac{1}{2}$ lin. long, more or less (sometimes obscurely) silky on the sides. Lower glume membranous,

ovate, acute or obtuse, up to $\frac{1}{4}$ lin. long, nerveless; upper lanceolate, acute, about 1 lin. long, 3-nerved, with 4 lines of very fine usually appressed hairs. Lower floret: valve oblong- or ovate-lanceolate, acute, 7-nerved, middle- and side-nerves (except the outermost) prominent, lines of usually appressed dense long very fine obtuse hairs between the inner side-nerves (of each half) and along the margins; valvule a hyaline scale up to $\frac{1}{5}$ lin. long or 0; lodicules minute. Upper floret oblong, shortly and acutely acuminate, chartaceous, whitish to pale slate-colour. Anthers \(\frac{3}{4}\) lin. long. Grain oblong, broad elliptic in cross section, 1 lin. by \(\frac{3}{8}\) lin.; scutellum elliptic, half the length of the grain.—Stapf in Dyer, Fl. Cap. vii. 375; Wood, Natal Pl. t. 137; Rendle in Journ. Linn. Soc. Bot. xl. 227. D. sp., Burchell, Trav. S. Afr. i. 537. Panicum commutatum, Nees in Linnæa, vii. 274: Fl. Afr. Austr. 25 (excl. most synonyms): not of Nees in Wight & Arn. Glum. Ind. Or. ined. no. 3; Durand & Schinz, Consp. Fl. Afr. v. 743 (partly); Eyles in Trans. Roy, Soc. S. Afr. v. 299?

Mozambique Distr. Portuguese East Africa: Beira, Rogers, 4545! Swynnerton, 1588! Lower Buzi River, Swynnerton, 1586. Rhodesia: Fechuanaland; Mahalapye, Rogers, 6101! Mochudi, Rogers, 6595! Leshumo Valley, Holub! Transvaal: Limvuba River, Nelson, 66!

Common throughout the eastern half of South Africa, rare in the west (Great Namaqualand to Piquetberg). Said to be good fodder for cattle (Wood, l.c.).

The only mature grains I have seen were in a specimen from Springbok Flats (Burtt Davy, 1122) which moreover is interesting on account of the rigid spreading double fringes of coarse yellowish hairs (\frac{1}{2}\) lin. long) from the spaces between the inner lateral nerves and of white soft hairs from the margins (\frac{2}{5}\) lin. long). Similar spreading soft marginal hairs occur in some of Pearson's specimens from the Great Karasberg (no. 8516), but the stiff yellow hairs which much resemble the "cilia" of the European "Digitaria ciliaris" were not observed in any other specimen. The amount and the length of the pubescence of the lower floret vary to an astonishing degree not only in the different individuals but in the same raceme, the hairs being either appressed or more or less loose, and, when they are short and lie close to the surface of the valve, the latter may seem to be glabrous. When the hairs in the space inside the inner nerve-pairs are loose and fluffy the glabrous median portion between them may appear deeply sunk below the level of the flanks although in reality it is not so.

(Rendle)

2. D. milanjiana, Stapf. Perennial, loosely exspitose from rather slender descending or creeping rhizomes, stoloniferous; stolons covered with short ovate obtuse strongly nerved and appressedly hairy or glabrescent thin cataphylls, sometimes rather long and branching. Culms erect or subgeniculate or gently ascending, 1 to over 3 ft. high, slender to stout, glabrous, basal internodes often numerous, followed by 2 or 4 (rarely more) elongated internodes, the terminal by far the longest. Leaves usually numerous at the base, thin, subherbaceous, rather loose, the lower generally keeled and often distinctly laterally compressed, short or long, glabrous or hirsute to villous, the upper mostly glabrous or nearly so, more terete and tight; ligules scarious, truncate, crenulate, glabrous,





up to 1 lin. long; blades linear to linear-lanceolate from an equally wide base, tapering to a fine point, 2 to over 1 ft. by 1½-5 lin., the lowest often short, flat, rather firm, glaucous-green, glabrous or more or less appressedly hirsute to almost tomentose, margins finely cartilaginous, often crisped, slightly rough, midrib very slender, obscure above, prominent below, lateral nerves fine, close, often obscure. Racemes few to many (up to 15), suberect or oblique, digitate or subdigitate and sessile, on a more or less stout and angular mostly short common axis, rather stiff and dense, 3-5 or occasionally up to 9 in. long, green or tinged (sometimes richly) with purple; rhachis trigonous, slightly wavy, $\frac{1}{4}$ lin. wide, lateral angles narrowly winged or marginate, scabrid, internodes about 1 lin. long; pedicels 2-nate, filiform, angular, scaberulous, the longer $\frac{3}{5} - \frac{3}{4}$ (rarely 1) lin. long. Spikelets tightly appressed, imbricate to subimbricate, lanceolate-oblong to linear-lanceolate, acute or acutely acuminate, $1\frac{1}{4}-1\frac{1}{2}$ lin. long, glabrous (at least apparently) or somewhat silky on the sides or ciliate-fimbriate. Lower glume a minute ovate acute or obtuse membranous scale; upper thin, lanceolate to linear-lanceolate, acute to acuminate, $\frac{6}{10}$ $\frac{7}{10}$ lin. long (excluding the apical hairs), 3-nerved, with usually appressed fine thin-walled obtuse-tipped hairs \frac{1}{5} lin. long (or if longer then also stiffer and subacute) between the nerves and along the margin. Lower floret corresponding in outline and size to the spikelet: valve rather firm, 7-nerved, nerves scaberulous, with fine lines of short hairs between the inner side-nerves and along the margins, the hairs often so closely appressed that the spikelets appear glabrous or the hairs of the inner lines mixed with or almost entirely replaced by yellowish acute at length rigidly spreading fine bristles up to over \frac{1}{2} lin. long; valvule and lodicules minute or the former up to 1/5 lin. long. Upper floret lanceolate, acutely acuminate, very slightly shorter than the lower, often purplish: valve thinly chartaceous, Anthers $\frac{1}{2} - \frac{3}{4}$ lin. long.—D. sanguinalis, vars. ciliaris and extensa, Rendle in Cat. Afr. Pl. Welw. ii. 163. D. Swynnertonii, Rendle in Journ. Linn. Soc. Bot. xl. 227, t. 6, figs. 6-10. Panicum milanjianum, Rendle in Trans. Linn. Soc. ser. 2, Bot. iv. 56. P. sanquinale, var. ciliare, Eyles in Trans. R. Soc. S. Afr. v. 301 (partly); not of others.

Nile Land. British East Africa: Rabai Hills near Mombasa, Taylor! Tanaland, Linton, 210! Ukambani; in grass-land near Kibwezi, 3300 ft., Scheffler, 152!

Lower Guinea. Portuguese Congo: Landana Hills, in sandy pastures, Gossweiler, 6054! Loanda, in sandy grassland, Gossweiler, 1567: 1579! 1610! Welwitsch, 7322! 7349! 7468! 7470! Barra do Dande; on the banks of the river Dande near Bombo, Welwitsch, 7280! Pungo Andongo (?), Welwitsch, 2855!

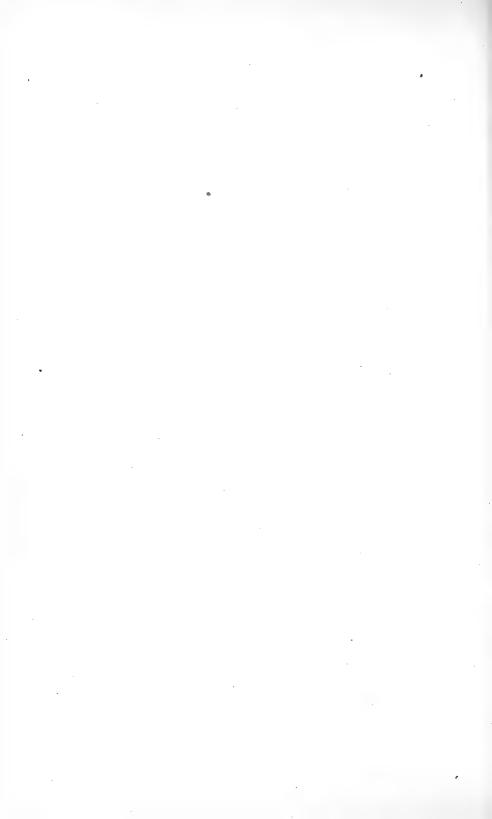
Mozambique Distr. Portuguese East Africa: Shupanga, Kirk! near Moramballa, Kirk! between Lupata and Senna, Kirk! Zinymbo Hills, 1500 ft.. Swynnerton, 1554! Nyasaland: Shire Highlands, Buchanan, 44! Mount Milanje, Whyte! Rhodesia: near Mumbwa, Mrs. Macaulay, 43! Victoria

Falls, Allen, 271! Mashonaland; North Mazoe District, Mundy! Salisbury, Eyles, 629! 633! Mrs. Craster, 9! 24! Matabeleland; Bulawayo, Appleton, 26! Insiza District, Mundy! Gazaland; Chirinda, Swynnerton, 1627!

A species of very varied habit and probably very plastic. The specimen from which it was originally described represents a rather robust state with erect or suberect culms 4 ft. high, rather long and glabrous or almost glabrous basal sheaths, and numerous long (5–8 in.) racemes. To it belong all the East African and Nyasaland specimens, and of the Angolan, Welwitsch, 2855, 7322 and 7349, and Gossweiler, 1610 and 6054. A curious form distinguished by radiating rather short culms, often long stolons, short and usually densely villous basal sheaths, and fewer and shorter (3–4 in.) racemes, was collected by Welwitsch (7468 and 7470) and Gossweiler (1567 and 1579) in the same area, mostly in sandy ground where according to Gossweiler the roots contribute considerably to the stabilization of the sand. The spikelets are rather uniform as to disposition, size and structure (apart from the presence or absence of setulæ).

3. D. seriata, Stapf. Perennial with a creeping branched rhizome emitting serially arranged culms in close or loose succession from extravaginal innovations, covered by strigillose-tomentose cataphylls. Culms erect, rather slender, up to over 4 ft. high, glabrous, 4-6noded, simple, rarely with a branch from near the base. Leafblades rather tight, terete, striate, the upper much shorter than the internodes, glabrous, smooth, moderately firm, the basal breaking down with the dying culms, not forming persistent coats; ligules scarious, rounded, usually very short, rarely up to 1 lin. long, glabrous; blades linear, tapering to a fine point, about 6 in. by $1\frac{1}{2}$ to almost 2 lin., flat with straight or sometimes crisp subscaberulous margins, flexuous, finely pubescent or quite glabrous and smooth, nerves numerous, very fine and close, the primary (3 or 4 on each side) hardly standing out from the others, midrib very slender. Racemes 3-6, sessile or subsessile, digitate or subdigitate on a slender angular common rhachis, up to \(\frac{3}{4}\) in. long, subtrect or spreading, 5-6 in. long, slender, straight or flexuous, rather loose, brownishor purplish-green; rhachis very slender, $\frac{1}{5}$ lin. wide, trigonous, angles marginate, scaberulous; pedicels 2-nate, finely filiform. more or less angular, scaberulous, unequal, the longer to over 1 lin. long, flexuous. Spikelets loosely appressed, the superposed distant by their own length, never imbricate, lanceolate-oblong, more or less acute, up to 1½ lin. long, apparently glabrous or obscurely silky on the sides. Lower glume a minute membranous ovate scale, up to $\frac{1}{10}$ lin. long; upper lanceolate, acute, about 1 lin. long, very faintly 3-nerved with 4 lines of very fine more or less appressed silky hairs. Lower floret: valve lanceolate-oblong, more or less acute, 7-nerved, middle and inner paired side-nerves prominent but fine, the outermost often faint, with lines of short appressed hairs in the narrow spaces between the inner 2 side-nerves (of each half) and of long ones (up to $\frac{3}{8}$ lin.) towards the margins, the hairs very fine, wavy, obtuse; palea and lodicules very minute, $\frac{1}{10}$ lin. long.





Upper floret thinly chartaceous, oblong, acute, pale brown, $1\frac{1}{4}$ lin. by $\frac{2}{5}$ lin. Anthers $\frac{1}{2}$ lin. long.

Lower Guinea. Angola: country of the Ganguellas and Ambuellas, Gossweiler, 3756! in Mumua woods in the Siengo-Kuito Valley, Gossweiler, 3761!

4. D. nodosa, Parl. Pl. Nov. vel Min. Not. 39, and in Webb & Bert. Phyt. Canar. iii. 384, t. 246. Perennial, with a short stout rhizome and close extravaginal innovations covered with silkytomentose cataphylls, rarely with some additional intravaginal innovations. Culms erect or shortly ascending, 1-1½ ft. high, glabrous, slender, usually 2-noded and simple with densely crowded basal leaves or the base lengthened up to over ½ ft., ascending with more distinct internodes and distant leaves, branching from the third or fourth node upwards, forming a bundle of secondary culms like the ordinary simple ones. Leaf-sheaths tight or the lower at length loosened, striate, the uppermost long-exserted, glabrous or loosely beset with spreading tubercle-based hairs, the lowest like the cataphylls silky tomentose towards the base and long-persistent; ligules scarious, up to over 1 lin. long, glabrous; blades linear, tapering to a fine point, 3-6 in. by 1-2 lin., flat, subflaccid, glaucous, glabrous or finely pubescent, besides being more or less beset with long spreading hairs particularly towards the base, margins cartilaginous, scaberulous upwards, lateral nerves numerous, fine and close, the primary rarely more prominent. Racemes 6 to many, sessile, digitate or subdigitate, with a slender more or less angular common rhachis (rarely over 2 in. long) and then often solitary or 2-3-nate, erect or obliquely erect, rarely spreading, slender, rather loose, 2-6 in. long, whitish green; rhachis very slender, $\frac{1}{4} - \frac{1}{8}$ lin. wide, triquetrous, angles marginate, scabrid; pedicels 2-nate, or lower down 3-4-nate (rarely), finely filiform, more or less angular, scaberulous, unequal, the longer up to over $1\frac{1}{2}$ lin. long. Spikelets loosely appressed, scarcely imbricate except when quite young, lanceolate, $1\frac{1}{4}-1\frac{1}{2}$ lin. long, more or less silky. Lower glume membranous, ovate or triangular, acute or obtuse, up to $\frac{1}{4}$ lin. long, nerveless; upper narrowly lanceolate, acute, up to 1 lin. long, 3-nerved with 4 lines of very fine usually appressed silky hairs. Lower floret: valve lanceolate, acutely acuminate, as long as the spikelet, thin, 7-nerved, middle and side nerves (except the outermost) prominent, lines of usually appressed long extremely fine subacute silky hairs between the inner two side-nerves (of each half) and along the margins or all over; valvule and lodicules very minute. Upper floret thinly chartaceous, narrowly oblong, finely and acutely acuminate, almost as long as the spikelet, first pale then turning brown; margins of the valve slightly distant, parallel. Anthers \(\frac{3}{4}\) lin. long.\(-D\). setigera, Schmidt, Beitr. Fl. Cap. Verd. Ins. 133 (partly). D. commutata, Coss. & Dur. Fl. Alg. 34. D. eriantha, Stapf in Kew Bulletin, 1907, 212, not in Dyer, Fl. Cap. D. sanguinalis, var. ciliaris, Stapf, l.c.

Panicum Parlatorei, Steud. Syn. Pl. Glum. i. 40; Batt. & Trab. Fl. Algér. Monoc. 131; Chiov. in Ann. Istit. Bot. Roma, viii. 295. P. commutatum, var. nodosum, Hack. in Durand & Schinz, Consp. Fl. Afr. v. 744. P. commutatum, var. β , Chiov. l.c. 30. P. pabulare, Aitch. & Hemsl. in Journ. Linn. Soc. Bot. xix. 190; Boiss. Fl. Or. v. 434. Paspalum sanguinale, var. pabulare, Hook. f. Fl. Brit. Ind. vii. 15.

Upper Guinea. Cape Verd Islands: S. Nicalao; Ribeira d'Agoa, Bolle!

S. Aptão; up the Ribeira Grande, Lowe! locally gregarious, Schmidt.

Nile Land. Eritrea: Assaorta; along the Addas torrent, Pappi, 2596
5163! Urug Valley, Pappi, 3356! Mount Dijot, Pappi, 2922. Somaliland: Wadaba, Miss Cole! in the valleys round Upper Sheikh, Appleton!

An imperfect specimen, collected by Linton (no. 69) at Makindu, British East Africa, may belong here.

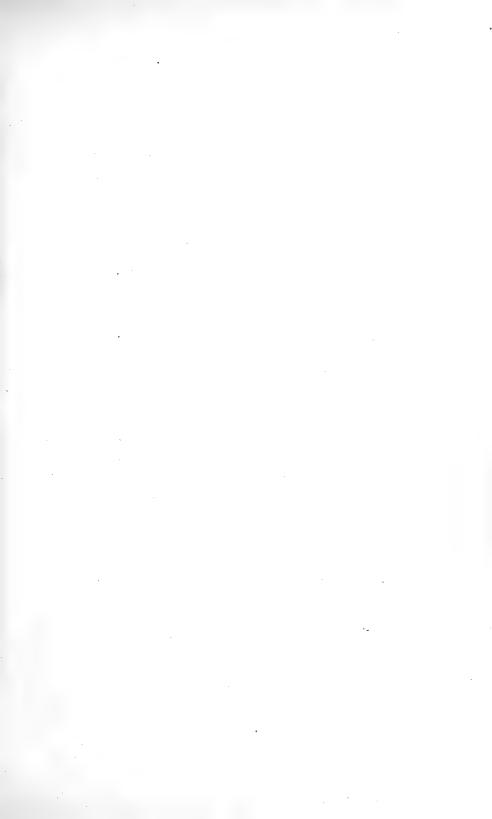
Also in Algeria, tropical Arabia, Afghanistan and the Punjab.

Sufficiently distinct from D. eriantha, Stapf, of the Cape, with which it has been confused, in the very slender relatively loose racemes, more lanceolate spikelets, and its much less compact growth. Said to be good fodder (Aitchison, Appleton).

(Hack.) 5. D. macroblephara, Stapf. Perennial (?). Culms erect, slender simple; uppermost internodes long-exserted. Leaf-sheaths terete, tight, quite glabrous or appressedly hairy at the nodes; ligules membranous, short, truncate, denticulate, blades linear, gradually tapering to an acute point, $1\frac{1}{4}-2\frac{1}{2}$ in. by $1-1\frac{1}{2}$ lin., flat, somewhat rigid, smooth, glaucescent. Racemes 3-5, digitate, 1\(\frac{3}{4}\)-2\(\frac{1}{2}\) in. long, suberect, flexuous, very loose, villous, pale; rhachis very slender, $\frac{1}{7}$ lin. wide, triquetrous, angles marginate, scabrid, internodes $1\frac{1}{2}$ lin. long; pedicels 2-nate, very unequal, the longer $\frac{3}{4}$ -1 lin. long, finely filiform, angular, slightly scaberulous. Spikelets more or less spreading, linear-lanceolate, $1\frac{1}{2}$ - $1\frac{3}{4}$ lin. long, villous. Lower glume a membranous ovate or ovate-lanceolate acute scale, up to almost ½ lin. long; upper lanceolate to oblong, acute, almost as long and as wide as the spikelet, hyaline, finely 3-nerved, with spreading hairs all over between the nerves and along the margins, hairs very fine, flexuous, solid towards the subacute or acute tips, up to $\frac{1}{4}$ lin. long. Lower floret corresponding in outline and size to the spikelet, thin, finely sub-7-nerved, submarginal nerve very faint, densely hairy between the inner pair of side-nerves and along the margin, hairs as in the upper glume but up to \(\frac{3}{8}\) lin. long, spreading at right angles; valvule and lodicules microscopic. Upper floret lanceolate, as long as the spikelet, acute, brownish, chartaceous.—Panicum macroblepharum, Hack. in Mém. Herb. Boiss. no. 20, 7; Engl. in Sitzungb. Preuss. Acad. Berlin, 1904, 41.

Nile Land. Somaliland: Haud, Laku, Keller!

6. D. Pearsonii, Stapf. Perennial, 1-2 ft. high, from a creeping branched rhizome whose very numerous and mostly very short internodes are naked or imperfectly covered with the remains of





the rather loosely hairy cataphylls. Culms erect or slightly geniculate below, about 6-noded, simple or branched from 1 or 2 of the lower nodes, slender, glabrous, collapsing and grooved when dry. Leaf-sheaths moderately tight, those embracing a branch slipping off the culm, thin, strongly striate, glabrous or sparingly hairy (the uppermost) to densely and softly hirsute, hairs spreading, tubercle-based; ligules membranous, truncate, up to 1 lin. long, glabrous or dorsally pubescent; blades linear-lanceolate from a rounded base, tapering to a fine point, up to 5 in. by 7 lin., the lowest often much shorter, flat, flaccid, more or less loosely pubescent, ultimately glabrescent above, margins narrowly cartilaginous, scabrid, midrib very slender, whitish, nerves very numerous and close, the primary hardly standing out from the rest. Racemes up to 15, sessile on a slender common rhachis (2-4 in. long, terete and smooth below and angular and rough above), the lowest in scanty false whorls or pairs, the others singly, subfastigiate, up to 4 in. long, spreading or oblique, very slender, greenish; rhachis filiform, straight or nearly so, triquetrous, $\frac{1}{7}$ lin. wide, pale with some very long extremely fine spreading hairs, angles narrowly marginate, scabrid, internodes 2-3 lin. long; pedicels 2-nate, finely filiform, angular, scaberulous, one very short, the other 1-2 lin. long. Spikelets loosely appressed, rather scattered, oblong, acute, about 1 lin. long, pale greenish, apparently quite glabrous. Lower glume a minute ovate membranous scale $\frac{1}{10} - \frac{1}{8}$ lin. long; upper thin, oblong-lanceolate, acute, $\frac{3}{4}$ lin. long, 3-nerved, with fine dense lines of hairs ($\frac{1}{7}$ lin. long) between the nerves and along the margins. Lower floret in outline and size corresponding to the spikelet: valve thin, finely 7-nerved, with fine lines of hairs between the inner side-nerves (of each half) and along the margins, hairs very fine, thin-walled with blunt tips, shorter than those of the upper glume; valvule and lodicules microscopic. Upper floret as long as the spikelet, oblong-lanceolate, acutely subacuminate, thinly chartaceous, margins of valve distant in flower. Anthers \frac{1}{2} lin. long.

Lower Guinëa. Angola : on the banks of small streams in clearings of dense forest at Granja San Luiz near Cazengo, Pearson, 2333!

7. D. Perrottetii, Stapf. Annual, 2–3 ft. high. Culms fascicled, erect or subgeniculate to prostrate and rooting at the base, 4–6-noded, simple or sparingly branched from the lower nodes, moderately slender, terete, glabrous, very smooth; lower stem-nodes mostly swollen. Leaf-sheaths loose, thin, finely striate, glabrous, the lower withering away; ligules reduced to a glabrous membranous rim; blades lanceolate to linear-lanceolate from a broad subcordate more or less clasping base, acuminate, 1½-4 in. by 4–9 lin., green, thin and flaccid, glabrous, smooth except at the slightly rough often crisped margins, midrib fine, lateral nerves very numerous, very fine and close. Racemes numerous in a succession of 6 or more whorls

or false whorls of 10-4, followed by 2-nate or scattered racemes on a slender glabrous smooth striate or subangular common axis whose lowest internodes are about 10, rarely up to 18 lin. apart, the following decreasing gradually in length to 3-2 lin., the whole forming an erect rather stiff panicle 4-8 in. long and 1-2½ in. wide; racemes very slender, obliquely erect or spreading, rather loose, $2\frac{1}{2}-1$ in. long; rhachis filiform, of the longest racemes bare below for up to 6 lin., but frequently with minute traces of arrested spikelets, loosely plumose towards the base with extremely fine tubercle-based hairs, subtriquetrous, $\frac{1}{10}$ lin. wide, angles very narrowly marginate, scaberulous, internodes 2-1 lin. long; pedicels usually 2-nate, one very short and not rarely barren, the other up to slightly over $\frac{1}{2}$ lin. long, filiform, angular, scaberulous, tips glabrous. Spikelets more or less appressed to the rhachis, oblong, acute, $\frac{3}{4} - \frac{9}{10}$ lin. by about $\frac{1}{3}$ lin., greenish to pale straw-colour when ripe. Lower glume suppressed, very rarely represented by a small hyaline scale; upper thin, oblong, acute, almost as long and wide as the spikelet, 3-nerved, with fine lines of delicate appressed blunt-tipped and thin-walled hairs between the nerves and along the margin. Lower floret corresponding in outline and size to the spikelet: valve similar to the upper glume but 5-nerved, nerves prominulous, fine lines of appressed or ultimately loose hairs between the lateral nerves and along the margins; valvule broad, truncate, $\frac{1}{10}$ lin. long, papillose; lodicules half as long. Upper floret oblong, subobtuse, equalling the spikelet or very slightly shorter, at length brown, chartaceous, tough, margins of valve widely distant when mature. Anthers $\frac{1}{2}$ lin. long, narrowly linear. Grain tightly enclosed in its floret and the closely appressed lower valve and upper glume, ovate-oblong in outline, subplano-convex to almost semicircular in cross-section, slightly over $\frac{1}{2}$ lin. by $\frac{1}{3}$ lin. whitish; scutellum broad-elliptic, half the length of the grain.— Panicum Perrottetii, Kunth, Rév. Gram. ii. 395, t. 111; Enum. i. 96; Durand & Schinz, Consp. Fl. Afr. v. 759. P. cristatum, Anderss. in Peters, Reise Mossamb. Bot. ii. 548; K. Schum. in Engl. Pfl. Ost-Afr. C. 100. Syntherisma Perrottetii, Chase in Proc. Biol. Soc. Washington, xix. 191.

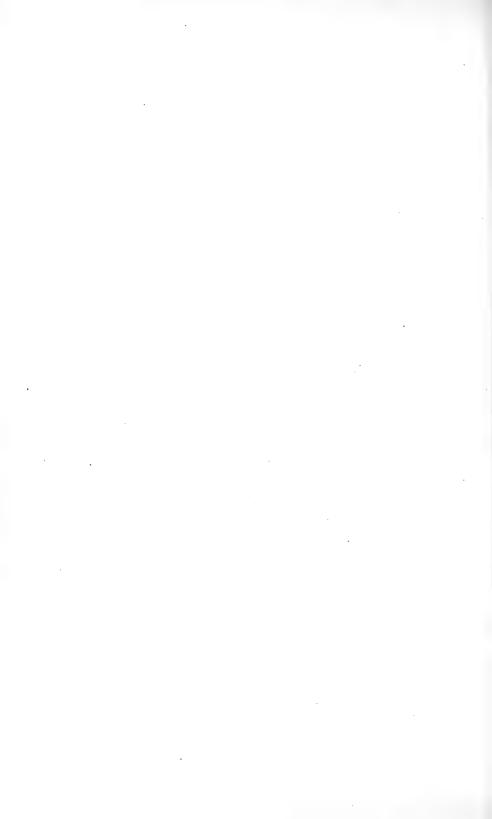
Upper Guinea. Senegal: without precise locality, Heudelot, 448! Huard! Roger!

Lower Guinea. Angola: Benguella; Cassuango-Cuiriri, Gossweiler, 2747! **Mozambique Distr.** Portuguese East Africa: Querimba Islands and mainland opposite them, Peters. Banks of the Zambesi, Carvalho! Rhodesia: north bank of the Zambesi at Victoria Falls, Rogers, 5723!

The Indian plant referred to this species (under Paspalum) in Fl. Brit. Ind. vii. 20, is a distinct species, D. wallichiana, Stapf (Panicum wallichianum, Steud. Syn. Pl. Glum. 41. P. multibrachiatum, Hochst. ex Steud. l.c. 74). D. Perrottetii appears to be confined to tropical Africa.

8. D. horizontalis, Willd. Enum. Hort. Berol. 92. Annual, from 1 to several ft. high. Culms tufted, ascending from a geniculate or

8 is D. fenestrata Rendle- according



more or less prostrate, sometimes rooting, branched base, slender, glabrous, few- to many-noded, the uppermost internode usually very long and long-exserted. Leaves glabrous or more or less hairy (particularly on the sheaths), hairs short or long and then usually spreading; sheaths somewhat loose, thin, the lower often slipping off the culms and finally withering away; ligules membranous, truncate, up to 1 lin. long, glabrous; blades linear-lanceolate to linear, equally wide and slightly rounded at or somewhat narrowed towards the base, tapering to an acute point, 2-5 in. by 2-6 lin., flat, flaccid, with a finely cartilaginous scaberulous and not seldom crisp margin, midrib very slender, prominent and pale below, primary lateral nerves very fine, up to over 6 on each side. Racemes 4 to many, subdigitate or on an angular common axis of variable length (1 to several in. long), solitary or the lower subverticillate, erect or spreading, slender, straight or almost so, rarely flexuous, $1\frac{1}{2}$ -6 in. long, usually finely pubescent or bearded at the base; rhachis slender, straight or slightly wavy, triquetrous, $\frac{1}{4} - \frac{1}{8}$ lin. wide, often with a few scattered very fine and very long spreading hairs, pale, angles narrowly winged, scabrid, internodes up to 1½ lin. long, rarely longer; pedicels 2-nate, one very short, the other up to $\frac{3}{4}$ lin. long, triquetrous, scabrid. Spikelets appressed, not or only indistinctly imbricate, linear-oblong, acute, $\frac{3}{4}$ -1 lin. long, pale green, usually apparently glabrous, at least when in flower. Lower glume a very minute ovate or truncate membranous scale, often quite obsolete; upper lanceolate-oblong to oblong, obtuse or subacute, equalling $\frac{1}{2}$ of the upper floret, thin, 3-nerved, with lines of silky hairs between the nerves and along the margins. Lower floret: valve of the outline and size of the spikelet, 7-nerved, with lines of hairs between the inner pair of side-nerves and along the margins, hairs extremely fine, silky, thin-walled, obtuse but not widened at the tips, straight or nearly so, closely appressed at first, the marginal often spreading at maturity, $\frac{1}{5}$ lin. long; valvule and lodicules microscopic. Upper floret linear-lanceolate, acuminate, at length brown; thinly chartaceous, margins of valve distant at maturity. Anthers $\frac{2}{5}$ lin. long. Grain oblong, $\frac{3}{4}$ lin. by $\frac{1}{4}$ lin., pale, subplano-convex; scutellum elliptic, almost half the length of the grain.—D. horizontalis, Stapf in Dyer, Fl. Cap. vii. 378, and in Kew Bulletin, 1907, 212; Wood, Natal Pl. ii. t. 140; Pobéguin, Ess. Fl. Guin. Franç. 219. jamaicensis, Spreng. Syst. i. 272. D. setosa, Hamilt. Prodr. Veget. Ind. Occ. 6. D. umbrosa, Link, Hort. Berol. i. 227. D. setigera, Hook. Niger Fl. 185; not of Roth. D. sanguinalis, T. Thoms. in Speke, Nile Exp. 652; non Scop. D. sanguinalis, var. horizontalis, Rendle in Cat. Afr. Pl. Welw. ii. 163. (D. fenestrata, Rendle, l.c.) Milium digitatum, Sw. Prodr. Fl. Ind. Occ. 24. Agrostis digitata, Poir. in Lam. Encycl. Suppl. i. 258. Axonopus digitatus, P. Beauv. Agrost. 154; Roem. & Schult. Syst. Veg. ii. 317. Panicum horizontale, G. F. W. Meyer, Prim. Fl. Esseq. 54; Kunth, Enum. i. 81; Nees, Fl. Afr. Austr. 24;

Long 17.

Hook. Niger Fl. 560; Steud. Syn. Pl. Glum. i. 39. Schweinf. Beitr. Fl. Aethiop. 300; Chiov. in Ann. Istit. Bot. Roma, viii. 30, 297. P. Hamiltonii, Kunth, Enum. i. 84. P. Zeyheri, Nees, Fl. Afr. Austr. 25; Steud. l.c. 40; Durand & Schinz, Consp. Fl. Afr. v. 767. P. fenestratum, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 361; Steud. l.c.; Engl. Hochgebirgsfl. Trop. Afr. 117; Durand & Schinz, l.c. 749. P. porranthum, Steud. l.c. 42. P. diamesum, Steud. l.c. 42. P. sanguinale, Balf. f. Bot. Socotra, 309; not of Linn. P. sanguinale, var. distans, Doell in Mart. Fl. Bras. ii. ii. 134. P. sanguinale, var. horizontale, Schweinf. in Bull. Herb. Boiss. ii. App. ii. 18; Durand & Schinz, I.e. v. 763; K. Schum. in Engl. Pfl. Ost-Afr. C. 100; De Wild. & Durand, Contr. Fl. Congo, i. fasc. ii. 73; Henriques in Bolet. Soc. Brot. xiii. 133; Rendle in Cat. Afr. Pl. Welw. ii. 163; Th. & Hél. Durand, Syll. Pl. Congol. 635. P. sanguinale, var. cognatum, Hack. ex Schweinf. in Bull. Herb. Boiss. l.c.; Durand & Schinz, l.c. 763, and Etudes Fl. Congo, 325; Th. & Hél. Durand, l.c. 634; Franch. Contr. Fl. Congo Franç. 46. P. sanguinale, var. fenestratum, Schweinf. in Bull. Herb. Boiss. l.c. P. sanguinale, var. filiforme, Durand & Schinz, l.e. P. sanguinale, var. porranthum, Franch. l.c. P. redemtum, Hochst., and P. psilostachyum, Hochst. ex Chiov. l.c. 297. Syntherisma setosum, Nash in Bull. Torr. Club, xxv. 300. S. digitatum, Hitch. in Contrib. U.S. Nat. Herb. xii. 142.

Upper Guinea. Cape Verd Islands: S. Antão, Lowe! Vogel, 57! 65! S. Jago, Brunner, 221! valley of S. Domingo, Hooker, 86! 87: Wilkes Exped.! S. Nicolao, Bolle! up to 2000 ft., Lowe! S. Vincent, Cunningham! Senegal, Doellinger! Leprieur! Sierra Leone: Sandugu, Thomas, 566! Rowala, Thomas, 1115! Mabum, Thomas, 1545! Sherbro Island, Hunter! and without precise locality, Don! Vogel, 68! Barter! Welwitsch, 2943! French Guinea: Timbo, Pobéguin, 1703! 1705! Kouroussa, Pobéguin, 498! 549! Liberia: Grand Bassa, Vogel, 27! Gold Coast: Aburi, Johnson, 831! 1010! and without precise locality, Farmar, 486! Togo: Lome, Warnecke, 340! Dahomey: Cotonou, Chevalier, 4477! Southern Nigeria: Opobo, Jeffreys, 6! 8! Lagos; Komaiko, Dawodu, 16! MacGregor, 6! Abbeokuta, Irving, 22! Aguku District, Thomas, 748! Old Calabar, Robb! Holland, 96! and without precise locality, Thomas, A7! 1370! Northern Nigeria: Lokoja, Richardson! Nupe, about villages, Barter, 1365! Abinsi, Dalziel, 880! Amar on the Benue River, Macleod! Cameroons: Victoria, Winkler, 53! Lolodorf, Staudt, 203! Batanga, in cassava fields and open bush, Bates, 48! and without precise locality, Preuss, 1152! Fernando Po: Clarence Peak, Vogel!

Fernando Po: Clarence Peak, Vogel!

Nile Land. Nubia: 21° N. Lat., sea coast to between 3000 and 4000 ft.,

Bent! Sudan: Sennar; opposite Bunzaga, Broun, 801! Eritrea: Amasen;

Gheleb, 5250 ft., Schweinfurth, 1180! Ginda, 2950 ft., Schweinfurth, 157, 180,

and numerous localities throughout the Colony (up to 8500 ft. in Ocule Cusai)

recorded by Chiovenda, l.c. Abyssinia: Tigre; Adoa, Schimper, 85! Hamedo

plain, 4600–6000 ft., Schimper, 988! Sana; banks of the Taccazze near Jela
jeranne, Schimper, 1618! Samen; banks of the Sellada stream and on mountains

near Gageros, 3400–7000 ft., Schimper, 2256! and without precise locality,

Schimper, 53! 180! 509! 910 (partly)! Somaliland: Golis Range, Drake
Brockman, 157! around Galkayo, Burao and Upper Sheikh, Appleton! Wagga

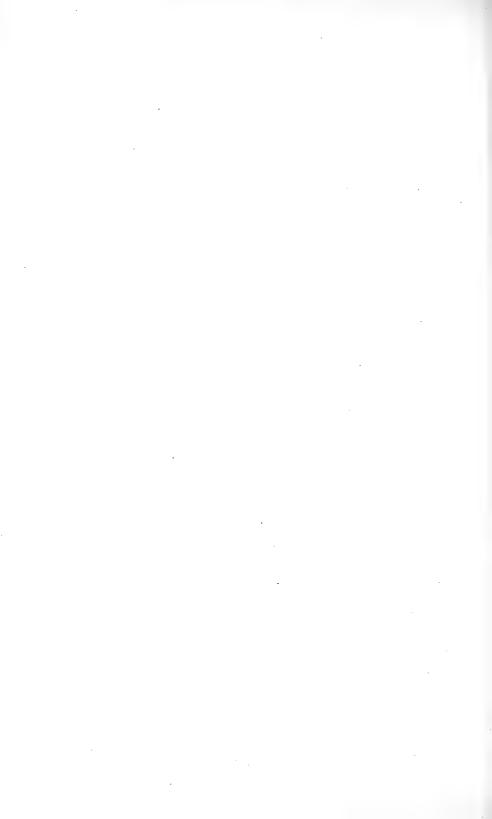
Mountains, Lort Phillips! Socotra, Bulfour, 128! 234! Uganda: Ruwenzori,

5300 ft., Scott Elliott, 7592! Coffee plantations near Kirrema, 4000 ft., Dummer,

347! and without precise locality, Grant! Lugard! British East Africa:

Ukambane, Scott Elliot, 2316, 6414! Kuiani, Scott Elliot, 6209! Nairobi,





Dowson, 187! Linton, 1! Ndara; Taita Mountains, in acacia scrub, Gregory!

Ngomeni; E. Angalora Mountains, Gregory!

Lower Guinea. Gaboon, Thollon! French Congo: Libreville, Thollon, 179! Belgian Congo: Lower Congo, Smith! Boma, Hens, A. 326! Stanley Pool District; Mokaba, Vanderyst, 3892! Leopoldville, Gillet! Angola: Golungo Alto, in woody meadows near Bumbo and Sanga, Welwitsch, 7184! in cotton fields near Sange, Welwitsch, 7173! Benguella; Fort Princeza Amelia, Gossweiler, 2010! Cazengo, Gossweiler, 5739!

weiler, 2010! Cazengo, Gossweiler, 5739!

Mozambique Distr. Zanzibar, Kirk! Last! German East Africa: Tanga, Volkens, 79! Marangu, Volkens, 643! Amboni, Holst, 2774! Nyasaland: dried-up bed of Karonga River, Scott! Namasi, Cameron, 19! near Blantyre, Scott! Portuguese East Africa: Msalue River, Allen, 137! Rhodesia: Umtali,

Sawer, 25! Gazaland; near Chirinda, Swynnerton, 964!

Also in Natal, the Mascarenes and tropical America. Elsewhere (India, Malaya) probably introduced. Much used for feeding horses and known as "Eran" in Lagos (Dawodu); considered as good fodder in Somaliland (Welwitsch, Appleton).

The earliest specific epithet appears to be "digitata" (Milium digitatum, Sw., hence Hitchcock's combination Syntherisma digitata), but this is not available owing to D. digitata, Büse. There is little doubt that the numerous localities given by Th. & Hél. Durand in their Sylloge under Panicum sanguinale p. 634) and the corresponding references to the Congo literature are mostly, if not altogether, referable to this species. The localities as far as not quoted above are from the following districts of the Belgian Congo: Cataractes, Equateur, Bangala, Uele, Kasai and Katanga.

9. D. marginata, Link, Hort. Berol. i. 229. Annual, 1 to over 2 ft. high. Culms tufted, usually ascending from a geniculate or prostrate and then often rooting base, simple or more often branched from the lower nodes, glabrous, few- to many-noded, upper node by far the longest and at length long-exserted. Leaf-sheaths thin, subherbaceous, loose, glabrous or more or less beset with spreading tubercle-based hairs which may be gathered at the base into a loose beard; ligules truncate, membranous, up to over ½ lin. long; blades linear-lanceolate to linear from a slightly contracted and rounded base, tapering to a slender acute point, up to 5 in. by 2-4 lin., flat, flaceid, glabrous or sparingly hairy particularly towards the mouth, margins finely cartilaginous, rough and often crisp, midrib very slender, whitish, lateral nerves numerous, the primary hardly standing out from the rest. Racemes mostly 4-9, sessile, subdigitate, solitary or 2-3-nate on a short angular scaberulous common axis, erect or spreading, rather slender, strict or slightly flexuous, 2-6 in. long, often finely pubescent at the base; rhachis almost straight, triquetrous, $\frac{3}{10} - \frac{2}{5}$ (rarely $\frac{1}{2}$) lin. wide, lateral angles winged, herbaceous, scabrid, internodes up to over 1 lin. long; pedicels 2-nate, one very short, the other up to \(\frac{3}{4}\) lin. long, angular, scabrid. Spikelets appressed, not or only slightly imbricate, lanceolate, acutely acuminate, $1-1\frac{1}{2}$ lin. long, pale greenish, rarely tinged with purple, variously hairy, rarely quite glabrous. Lower glume an ovate obtuse to subacute membranous scale usually not over $\frac{1}{6}$ lin. long, sometimes obsolete or quite suppressed; upper ovate-lanceolate, acute, equalling or more often considerably exceeding half of the upper floret, rarely

distinctly shorter, 3-nerved, with fine lines of hairs between the nerves and along the margins, rarely quite glabrous. Lower floret: valve corresponding in outline and size to the spikelet, firmly membranous, 7-nerved, nerves quite smooth, the lateral usually rather distant from the middle nerve, approximate along the submarginal flexure, more or less prominent, particularly the inner, rarely quite glabrous, usually with fine lines of hairs between the inner side-nerves (of each half) and along the margins, the inner line of hairs not rarely augmented by a row of fine tubercle-based acute yellow bristles, hairs very fine, thin-walled, obtuse-tipped, straight or flexuous, closely appressed at first, ultimately loosened or somewhat stouter and like the bristles spreading at right angles and forming with them a rigid double fringe on each side of the spikelet; valvule and lodicules minute. Upper floret oblong-lanceolate, acutely acuminate, almost as long as the spikelet, thinly chartaceous, pale or slightly purplish, brownish when ripe, margins of valve slightly distant. Anthers about $\frac{3}{8}$ lin., more rarely $\frac{1}{4}$ or up to $\frac{9}{10}$ lin. long. Grain oblong, about $\frac{4}{5}$ lin. by $\frac{1-3}{4-10}$ lin., plano-convex, whitish; scutellum less than half the length of the grain.

This species, which occurs all over the tropics and also extends into some subtropical regions, has so far been found in Tropical Africa in the following modifications.

Var. Linkii, Stapf. Upper glume usually much exceeding the middle of the fertile floret and frequently equalling $\frac{1}{2}$ of its length; indumentum of spikelets uniform; hairs of the lower floret in fine lines, all of one kind, very fine, thin-walled, obtuse-tipped, at first tightly appressed, then more or less loose.—D. marginata, Link, Hort. Berol. i. 229 (sensu stricto). D. inæqualis, Link, l.c. i. 224. D. sanguinalis, Stapf in Dyer, Fl. Cap. vii. 378 (partly). Panicum glaucescens, Nees, Agrost. Bras. 100. P. sanguinale, var. longiglume, Trin. ex Nees, l.c.; Chiov. in Ann. Istit. Bot. Roma, viii. 296. P. linkianum, Kunth, Rév. Gram. 33. P. Neesii, Kunth, Enum. i. 84. P. ægyptiacum, a genuinum, Chiov. l.c. (partly?). Paspalus inæqualis, Link ex Schult. Mant. ii. 174. Paspalum sanguinale, var. commutatun, Hook. f. Fl. Brit. Ind. vii. 15. Syntherisma marginatum, Nash in North Amer. Fl. xvii. 154.

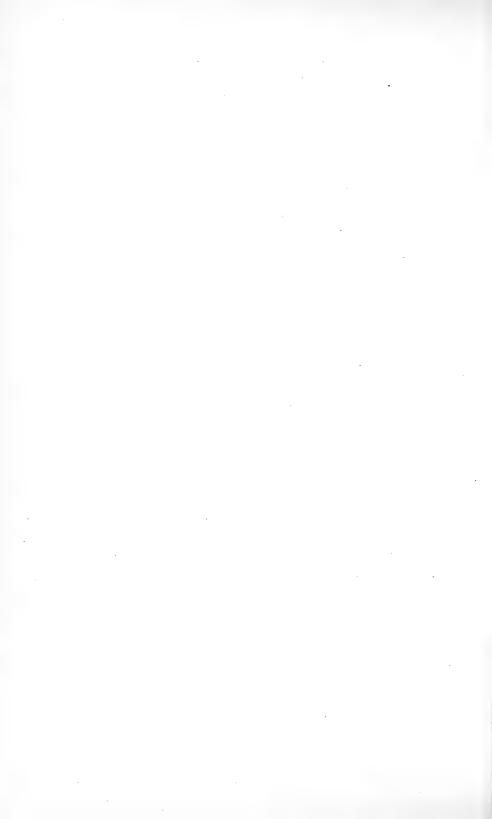
Nile Land. Eritrea: Dembelas, Ferfer, Pappi, 6129, 6144; Acran, along the Dharo torrent, 5900 ft., Pappi, 3033.

Throughout the warmer parts of the New and the Old World, but apparently very rare in Tropical Africa. The Eritrean specimens quoted above are referred here on account of Chiovenda's description of their "glumes II. and III." (upper glume and lower floret) as "sericeo-lineate, glabrescenti." He refers them to Panicum wayyptiacum, Retz., var. genuinum, but this appears to be merely a perfectly glabrous state of D. sanguinalis. The variety has been collected in typical specimens in Yemen.

Var. fimbriata, Stapf. Upper glume as in var. Linkii; indumentum of spikelets uniform or more often more or less varied in the same inflorescence; heirs of the upper glume and leave department the given in the Linkii partly more

Var. fimbriala, Stapf. Upper glume as in var. Linkii; indumentum of spikelets uniform or more often more or less varied in the same inflorescence; hairs of the upper glume and lower floret partly as in var. Linkii, partly more thick-walled with slightly clavate tips, and up to ½ lin. long, spreading out at maturity and forming a rigid double fringe on each side of the spikelet, the inner fringe often mixed with a varying number of tubercle-based acute yellow bristles which ultimately also spread out at right angles.—D. fimbriata, Link, Hort. Berol. i. 226. D. commutata, Schult. Mant. ii. 262. D. chrysoblephara, Fig. & De Not. in Mem. Acc. Tor. ser. ii. xiv. 364. D. sanguinalis, var. ciliaris, Rendle in Cat. Afr. Pl. Welw. ii. 163, and in Journ. Linn. Soc. Bot. xl. 228;





Cheval. Sudania, 32, 159. Panicum ciliare, Retz. Obs. iv. 16 (?); Roxb. Fl. Ind. ed. Carey, i. 290; A. Rich. Tent. Fl. Abyss. ii. 360; not of Koel. P. fimbriatum, Presl, Rel. Haenk. i. 298; Kunth, Enum. i. 81. P. sanguinale, var. ciliare, Franch. Contr. Fl. Congo Franç, 46; Eyles in Trans. Roy. Soc. S. Afr. v. 301; not of Doell. P. sanguinale, var. blepharanthum, Hack. in Durand & Schinz, Consp. Fl. Afr. v. 762 and ex K. Schum. in Engl. Pfl. Ost-Afr. C. 100. P. sanguinale, var. macrostachyum, Hack. in Durand & Schinz, l.c. 763. Syntherisma fimbriatum, Nash in Bull. Torr. Bot. Club, xxv. 302.

Upper Guinea. Senegal: Casamance; Ziguinchor, Chevalier, 2188 bis! and without precise locality, Richard! Sierra Leone: without precise locality,

Welwitsch, 2937 (partly).

North Central. Bagirmi: Nigai, Chevalier, 9462!

Nile Land. Nubia: Berber, Schweinfurth, 642! Eritrea: Beni Amer; Mount Damba, Pappi, 5976! Carajai, Pappi, 6637; Munsura, Pappi, 7195. Maragus: Cohait, 5575 ft., Pappi, 1014. Abyssinia: Sana; on the sandy banks of the Taccazze near Jelajeranne, Schimper, 1616! Samen; in shady places near Mawerr, 3000-4000 ft., Schimper, 2162! Awarra, 3000-3500 ft., Schimper, 121!

Lower Guinea. Gaboon, Griffon du Bellay. Loango, Lecomte. Mozambique Distr. German East Africa: Kageli, Fischer, 642.

Along with var. Linkii in the tropics of both hemispheres, but very scarce in America, rarely found beyond the tropics. The peculiar indumentum of the spikelets, which in the mature state leads to the formation of spreading fringes, may extend to all spikelets alike or it may be, at least in its perfect development, confined to the long-pedicelled member of each pair of spikelets or only to some of them, in which case the indumentum of the fringeless spikelets approaches more or less that of var. Linkii.

Var. nubica, Stapf. Upper glume equalling half of the upper floret or shorter; spikelets quite glabrous and smooth.—P. sanguinale, var. ægyptiacum, Hack. in Durand & Schinz, Consp. Fl. Afr. v. 762 (partly).

Nile Land. Nubia: Wadi Halfa, Kralik! between Old Dongola and Merowah, Bromfield! Berber, Schweinfurth, 642 (partly)! Khartoum, Kotschy, 429! Eritrea: Tingar, Ehrenberg!

This variety approaches *D. sanguinalis*, Scop., but may be distinguished by the perfectly smooth nerves of its barren florets and the mostly narrower and more acuminate spikelets. It seems to be confined to the tropical portion of northwest Africa. *D. ægyptiaca*, Retz., as generally understood—I have not seen the original—is the perfectly glabrous state of *D. sanguinalis* with the scabrid nerves of the barren florets characteristic of that species. *D. sanguinalis*, Scop. (sensu stricto), does not seem to occur in tropical Africa, as Pilger (in Engl. Jahrb. xxx. 118) also observes.

10. D. acuminatissima, Stapf. Annual. Culms erect from a shortly ascending and rooting base, over 2 ft. high, sometimes apparently tall and rather stout, quite glabrous, 6- or more-noded. Leaf-sheaths somewhat loose and firm, quite glabrous and smooth or with a very few tubercle-based hairs near the mouth; ligules short, rounded, membranous, about 1 lin. long; blades linear from an equally wide or slightly narrowed base, gradually tapering to a very acute point, up to over 6 in. by 2–3 lin., flat, rather firm, flexuous, quite glabrous or with a few tubercle-based hairs near the base, slightly rough on both sides, margins finely cartilaginous and rough, midrib very slender, whitish, lateral nerves very numerous and close, fine. Racemes up to 20, sessile, subdigitate on a common angular upwards rough axis (1–3 in. long), erect or suberect, fastigiate,

scattered or pseudo-verticillate, slender, straight or slightly curved, 6-8 in. long, greenish; rhachis slender, straight, triquetrous, $\frac{1}{5}$ lin. wide, lateral angles narrowly winged, very rough, herbaceous, wings usually narrower than the dorsally flattened midrib, internodes about 1 lin. long; pedicels 2-nate, very unequal, filiform, angular, scaberulous, the longer 1 lin. long. Spikelets linear-lanceolate, acutely acuminate, with the slender acumen often curved, $1\frac{1}{3}-1\frac{1}{3}$ lin. by \(\frac{3}{8}\) lin., glabrous or ciliate, straw-coloured. Lower glume a membranous ovate scale, about $\frac{1}{6}$ lin. long; upper lanceolate, acute, about ½ lin. long, thin, faintly 3-nerved with appressed short fine hairs between the nerves and along the margins. Lower floret: valve corresponding in outline and size to the spikelet, firmly chartaceous, 7-nerved and scabrid on the nerves, at least upwards, glabrous or with fine short appressed hairs, rarely with longer and ultimately loose ones along the margin, with or without yellowish tubercle-based bristles up to over ½ lin. long which ultimately become spreading from the narrow space between the inner pair of side nerves, hairs very thin-walled with obtuse or subacute tips; valvule and lodicules very minute. Upper floret slightly shorter than the spikelet, linear-lanceolate, acutely acuminate, thinly and rather rigidly chartaceous, slightly darkening on maturity. Anthers about $\frac{2}{5}$ lin. long. Grain linear-oblong, $\frac{9}{10}$ lin. by $\frac{3}{10}$ lin., plano-convex, whitish; scutellum equalling about $\frac{1}{3}$ of the grain.—Digitaria sanguinalis, var. subacuminata, Stapf (name only) ex Cheval. Sudania

Upper Guinea. French Sudan: San, Chevalier, 2218! between Goudam and Faginbing, Chevalier, 2284! Northern Nigeria: Abinsi, a common weed, Dalziel, 907!

Used as a fodder according to Dalziel.

11. D. monodactyla, Stapf, var. explicata. Stapf. Perennial, compactly or loosely tufted with intravaginal innovations. Culms very slender, erect, from 1 to over 2 ft. high, 1-2-noded, simple, glabrous. Leaves crowded at the base; sheaths tight, rather firm, more or less finely and appressedly hirsute, the lower long-persistent, their bases forming a dense ultimately often fibrous coating; ligules reduced to a transverse membranous rim; blades of the basal leaves very narrowly linear, 2 to over 6 in. long, at first convolute, then temporarily or permanently flat and up to over 1 lin. wide, rather rigid or more or less flexuous, firm, glabrous or sparingly appressedly hairy, the hairs often springing from flat tubercles, midrib and primary lateral nerves (3-4 on each side) prominent above, forming slender ribs with smooth bands of highly developed motor cells between them; blade of the uppermost culm-leaf subsetaceous, rarely over 2 in. long. Raceme spike-like, solitary, terminal on the long-exserted culm, very slender, 2-6 in. long, yellowish-green, rather rigid; rhachis wavy, ½ lin. wide, triquetrous with narrow green herbaceous





white-ciliate wings; pedicels 2-nate, hispidulous or loosely pubescent to (upwards) densely ciliate, unequal, the longer up to $\frac{3}{4}$, rarely 1, lin. long, more or less curved, slightly angular. Spikelets tightly appressed to the rhachis, subimbricate, oblong-lanceolate to lanceolate in outline, $1\frac{1}{4}$ - $1\frac{3}{4}$ lin. long, silky. Lower glume quite suppressed or reduced to a microscopic hyaline scale; upper linear-lanceolate to lanceolate, acute, $\frac{3}{4}$ -1 lin. long, thin, finely 3-nerved (the middle nerve sometimes obscure), densely hairy all over except on the hyaline margins, hairs appressed, exceeding the tip. Lower floret: valve oblong-lanceolate, corresponding in shape and size to the spikelet, acute to acuminate, thin with glabrous hyaline margins, 5-nerved, middle nerve much finer than the lateral or almost obscure, these densely and appressedly hairy, hairs straight, sharply pointed, shortly exceeding the tip of the valve; valvule a minute ovate hyaline scale up to \(\frac{1}{4}\) lin. long; lodicules minute. Upper floret lanceolate-acute to acutely acuminate, 1 lin. long, thinly coriaceous and brown. Anthers \frac{1}{2} \lin. \long.\to D. monodactyla, Rendle in Cat. Afr. Pl. Welw. ii. 162. Panicum monodactylum, Eyles in Trans. nees. Roy. Soc. S. Afr. v. 300.

Lower Guinea. Angola: in wooded pastures near Quilànga, Welwitsch, 2823! common in wooded meadows between Candumba and Calundo, Welwitsch, 7431! country of the Ganguellas and Ambuellas, Gossweiler, 2425! in sandy meadows west of Munongue, Gossweiler, 2457! Huilla; in elevated meadows at Oahoia, Sobato Humpata, Welwitsch, 2662!

Mozambique Distr. Rhodesia: Salisbury, Mundy! Somnabula, Nobbs,

663

Also in the Transvaal (Apies River, Nelson, 102! and Botsabelo, Schlechter, 3781!).

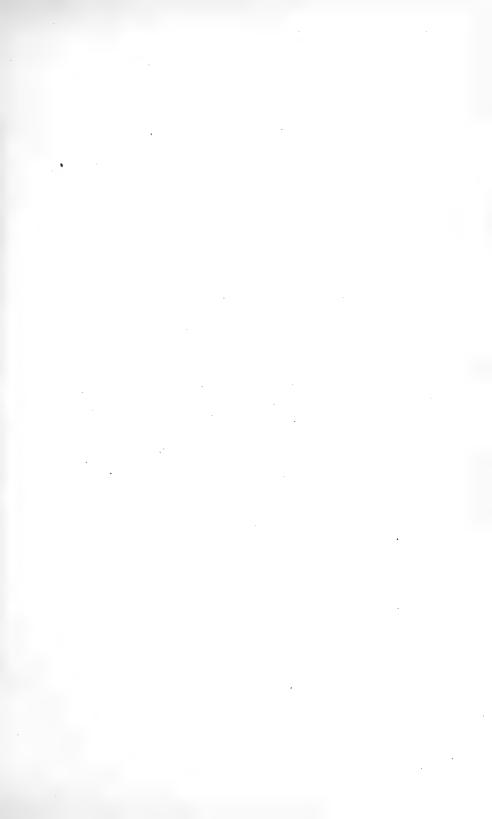
This variety differs from the type form only in the structure of the blades of the basal leaves, which in the latter are finely setaceous, $\frac{1}{5}-\frac{1}{4}$ lin. in diam., glabrous or very finely and sparingly hairy and devoid of motor cells; hence they do not unroll. They have only 2 lateral ribs on each side of the midrib and the outer cell-walls of the dorsal epidermis are very conspicuously thickened. The type form is confined to the area of the "Flora Capensis," from Pretoria southwards; but specimens collected by Schlechter at Grahamstown (no. 2715) have, besides the leaves characteristic of the type-form, others which possess well-developed motor cells and unroll more or less. Their dorsal epidermis, however, is as in the type. Whether this indicates merely instability of characters or seasonal dimorphism will have to be decided in the field or by experiment. The Angolan specimens are generally more robust and have firmer leaf-blades than the Rhodesian and Transvaal specimens, which as to stature often approach the type-form. Welwitsch, 2823 and 7431, and to a lesser degree, 2847, which is unaccompanied by notes, are distinguished by the laxness of growth, the tufts consisting of loose bunches of culms springing from slender erect or ascending bases.

12. D. compressa, Stapf. Perennial, compactly cæspitose with a dense coat of fibres at the base; innovations intravaginal. Culms erect, slender, up to over $1\frac{1}{2}$ ft. high, glabrous, 2-noded, compressed, particularly the uppermost, very slender and long-exserted internode, simple. Leaf-sheaths somewhat loose, striate, softly and

shortly hirsute, the lowest white-tomentose or villous at the base, at length breaking up into long-persistent fibres; ligules reduced to a scarious rim; blades narrowly linear, loosely convolute, at length sometimes flat, tapering to a setaceous point, of the basal leaves up to 1 ft. long, of the cauline very much shorter, flattened out up to 2 lin. wide, flexuous or rigid, glabrous or more or less finely hirsute towards the base, margins scaberulous upwards, lateral nerves numerous, close, primary (about 4 on each side) slightly prominent. Racemes 6-8, sessile or subsessile, subdigitate, with a slender angular common rhachis $(1-1\frac{1}{2})$ in. long, erect, up to over 3 in. long, subcomposite and rather dense downwards, loose above, greenish; rhachis very slender, $\frac{1}{6}$ lin. wide, triquetrous, angles marginate, scabrid; pedicels 2-4-nate, very unequal, the longest up to 2 lin. long, or those of the short secondary racemes often solitary and subsessile; pedicels and secondary rhachises finely filiform, angular, scabrid. Spikelets subappressed, the lower imbricate, the upper gradually looser (the internodes of the rhachis equalling or exceeding the longest pedicel), oblong, subacute, $1\frac{1}{4}$ lin. long, pale, apparently glabrous or nearly so. Lower glume a minute hyaline membrane breaking up and disappearing very soon, or 0; upper oblong, subobtuse, $\frac{4}{5}$ lin. long, 3-nerved, with 4 lines of fine short closely appressed silky hairs. Lower floret: valve oblong, subacute, $1\frac{1}{4}$ lin. long, 7-nerved, middle and side nerves slender, prominent (except the outermost), with dense lines of hairs between the inner two side-nerves (of each half) and along the margins, hairs appressed, about $\frac{1}{6}$ lin. long as fine as in D. eriantha, but with slightly thickened tips; valvule and lodicules very minute. Upper floret lanceolate, acute, almost $1\frac{1}{4}$ lin. by $\frac{2}{5}$ lin., thinly chartaceous, pale, turning brown. Anthers \frac{1}{2} \lin. \long.

Mozambique Distr. Rhodesia: Matabeleland; Insiza, Mundy, 2170!

13. D. nardifolia, Stapf. Perennial, compactly cæspitose; innovations intravaginal. Culms erect, very slender, 1-2 ft. high, glabrous, with only 1 suprabasal node, simple. Leaf-sheaths tight, striate, the uppermost 5-6 in. long, with white soft spreading hairs, those of the innovations short, firm, soon glabrescent or glabrous, at length breaking up into tough dark persistent fibres; ligules a scarious rim; blades setaceously folded or subconvolute, acute, curved or flexuous, 4-6 in. long, $\frac{1}{4}$ lin. in diam., rarely unrolling and then ½ lin. wide, almost wiry, loosely hairy towards the base or quite glabrous, finely 5-ribbed on the upper (inner) side, smooth on the back. Racemes 3-7, sessile or bare at the base for a short distance owing to the arrest of the spikelets, subdigitate on a very slender terete (below) to angular smooth common axis $\frac{1}{2}$ to over 1 in. long, erect or slightly arching, 2-4 in. long, slender, loose, greyishgreen; rhachis very filiform, slightly wavy, $\frac{1}{10} - \frac{1}{8}$ lin. wide, triquetrous, angles finely marginate, smooth or very sparingly scaberulous,





internodes 1½-2½ lin. long; pedicels 2-3-nate, finely filiform, subangular, more or less scaberulous, unequal, the longer about 1 lin. long. Spikelets loosely appressed, of successive pairs approximate or with a clear interval between the pairs, oblong to elliptic-oblong, acute to subacute, 1-14 lin. long, obscurely silky. Lower glume a very delicate white cuff-like membrane, soon breaking up; upper lanceolate, acute, equalling the spikelet or slightly shorter, 3-nerved with 4 lines of very fine appressed silky hairs. Lower floret: valve oblong, acute, equalling the spikelet, 7-nerved, nerves fine, prominent (except sometimes the outermost), with lines of usually appressed slightly wavy hairs between the inner side-nerves (of each half) and along the margins, hairs as fine as in D. eriantha, but with the obtuse tips slightly widened or towards the tip of the spikelet yellow and subcapitellate, $\frac{1}{4} - \frac{1}{3}$ lin. long; valvule and lodicules very minute. Upper floret oblong, shortly and acutely acuminate, equalling the spikelet, firmly chartaceous, brown.

Lower Guinea. Angola: country of the Ganguellas and Ambuellas, Gossweiler, 2386!
South Central. Belgian Congo: Katanga, Homblé, 10!

14. D. capitipila, Stapf. Perennial (base unknown). Culms slender, sheathed high up, glabrous. Leaf-sheaths (upper) tight, finely striate, glabrous and smooth or sparingly hairy upwards; ligules very short, scarious, truncate, ciliolate; blades erect, narrowly linear from an equally wide or slightly contracted base, long-tapering to a fine point, up to 5 in. by $1\frac{1}{2}$ lin., the uppermost much shorter and quite imperceptibly passing into the long (6-9 in.) sheath, flat with narrowly involute margins, rather firm, finely hairy on both sides, midrib and primary side-nerves hardly differentiated, somewhat stout, very slightly prominent below. Racemes 5-8, sessile, scattered on a very slender upwards angular common axis (up to over 3 in. long), fastigiate, slender, loose, up to 6 in. long; rhachis filiform, triquetrous, $\frac{2}{10} \frac{4}{10}$ lin. wide, very finely marginate, slightly scaberulous, internodes up to 3 lin. long; pedicels mostly 2-nate, unequal, the longer 1½ lin. long, finely filiform, flexuous, angular, obscurely scaberulous with subdiscoid tips. Spikelets oblong, subacute, $1\frac{1}{2}$ - $1\frac{3}{4}$ lin. long, pale or brownish-green, dirty and fluffysilky. Lower glume a short delicate hyaline truncate membrane, early breaking up, upper oblong, subacute, $1\frac{1}{4}$ lin. long, thin, 3-nerved, with dense lines of hairs between the nerves and along the margins, hairs very fine, up to $\frac{1}{4}$ lin. long, exquisitely capitellate. Lower floret corresponding in outline and length to the spikelet: valve thin, flat, 7-nerved, with dense lines of hairs between the inner side-nerves and along the margins, hairs as in the upper glume, but shorter; valvule truncate or 2-fid, up to $\frac{1}{5}$ lin. long, lodicules half as long. Upper floret oblong, acute, turning dark brown,

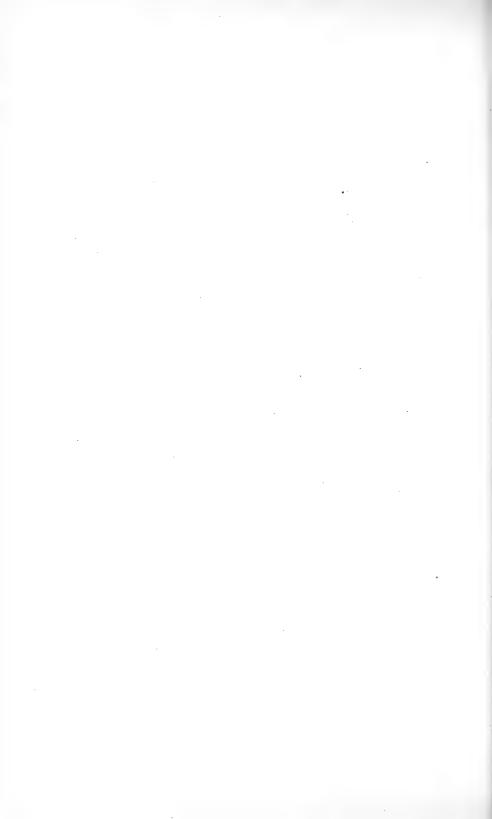
rather convex on the back, as long as the spikelet, thinly chartaceous, margins of valve meeting. Anthers 1 lin. long.

Mozambique Distr. Nyasaland: without precise locality, Buchanan, 1443!

15. D. seminuda, Stapf. Perennial, with a very short early disintegrating rhizome; innovations extravaginal, few, with glabrous cataphylls, up to over 3 ft. high. Culms erect, slender, simple. up to 8-noded, glabrous, smooth, lower and intermediate internodes usually shorter than or as long as the sheath, upper or uppermost exserted. Leaf-sheaths somewhat tight, glabrous, striate; ligules membranous, truncate, ciliolate, very short; blades linear, longtapering to a fine point, up to over $1\frac{1}{2}$ ft. by 2 to over $2\frac{1}{2}$ lin., flat. green, somewhat firm but flexuous, glabrous, rough above, midrib slender; primary lateral nerves 4-5 on each side, rather prominent. Racemes up to 10, sessile, subdigitate, subcomposite at the base (secondary racemes very short) with a slender more or less rough common rhachis from 1 to 3 in. long (the lowest raceme usually solitary and distant from the following), erect, slender, straight, 5-9 in. long, pale greyish-green in flower, rather dense, particularly downwards; rhachis straight, slender, up to 1 lin. wide, triquetrous and narrowly marginate at the base, higher up flat, winged, wings green, scabrid along the margins, rough on the face, midrib stout. smooth, whitish, rounded on the back, slightly raised and scaberulous on the face, internodes up to 1 lin. long; pedicels in clusters of up to 6, finely filiform, flexuous, terete or the longer more or less angular, scaberulous, with small discoid tips, the longest up to 1 lin. long. Spikelets appressed, imbricate, secund at least upwards, oblong-lanceolate, very acute or acutely acuminate, 1 lin. long, obscurely appressedly silky. Lower glume a very minute cuff-like scale at the base of the spikelet, early breaking up and disappearing; upper ovate to lanceolate, obtuse or acute, $\frac{2}{5}$ lin. long, delicately 3-nerved, with 4 lines of very fine appressed or loose and flexuous thick-walled obtuse (but not clavate-tipped) hairs up to $\frac{2}{5}$ lin. long. Lower floret: valve of the shape and size of the spikelet, thin, 7-nerved, with the nerves fine, often obscured by the pubescence, except the middle one, 7- or sub-7-nerved, with lines of short hairs between the inner pairs of side-nerves of each half and along the margins, appressed or the submarginal loose; valvule an ovate delicate scale up to $\frac{1}{6}$ lin. long, exceeding the minute odicules. Upper floret lanceolate, acutely acuminate, as long as the spikelet, early dark brown, the back very incompletely covered by the upper glume, the valve with whitish hyaline parallel somewhat distant margins. Anthers hardly \frac{1}{2} lin. long.

Upper Guinea. Sierra Leone: Mabum, 370 ft., Thomas, 1516! French Guinea: Kouria, Chevalier, 15020! Southern Nigeria: Opobo, Jeffreys, 24!





16. D. pellita, Stapf. Perennial, compactly cæspitose; innovations intravaginal. Culms erect, stiff, rather slender, up to 6 ft. high, glabrous, 2-noded, simple. Leaf-sheaths tight, finely striate, much shorter than the internodes, densely and appressedly hirsute to tomentose all along or (the uppermost) upwards only, glabrous at the nodes, the lowest crowded, hard and long-persistent, tightly coating the shoots for 3-5 in.; ligules reduced to a long-ciliate rim, cilia up to almost 2 lin. long; blades linear, tapering to a fine point, over 1 ft. long, tightly convolute, then unrolling and up to 2 lin. wide, hard, densely and appressedly greyish-tomentose on the back, less so to almost glabrous on the face, primary lateral nerves numerous, very close, midrib slender. Racemes 3-4, sessile, subdigitate with an angular common rhachis which is very villous at the nodes and up to 1½ in. long, erect, 6-7 in. long, stiff, greyish; rhachis straight or more or less wavy, slightly over $\frac{1}{2}$ lin. wide, triquetrous, angles marginate or narrowly winged, scabrid; pedicels 2-4-nate, very unequal, the longest about 2 lin. long, angular, scabrid. Spikelets subappressed, imbricate or subimbricate, oblong-lanceolate, acuminate, up to $1\frac{3}{4}$ lin. long, silky on the side, the silk exceeding the spikelets. Lower glume truncate-rotundate, embracing the base of the spikelet, up to over \(\frac{1}{4}\) lin. long, extremely delicate, white, hyaline, nerveless, easily rubbed off; upper narrowly lanceolate, very acute, $1-1\frac{1}{2}$ lin. long, 3-nerved, with 4 lines of hairs, the hairs of the inner lines short, those of the outer up to \(\frac{3}{4}\) lin. long, wavy, acute, appressed or more or less spreading, forming a dense fringe of cilia. Lower floret: valve oblong-lanceolate, acutely acuminate, thinly membranous, pale, sometimes faintly tinged with purple, 5-nerved with the nerves about equally distant, with a dense fringe of wavy silky cilia pointing forward, cilia up to 1 lin. long, often pinkish, acute; valvule, if present, and lodicules very minute, $\frac{1}{20} - \frac{1}{15}$ lin. long. Upper floret lanceolate, acutely acuminate, up to $1\frac{3}{4}$ lin. long, chartaceous, pale brown.

Lower Guinea. Angola: Benguella; in Mumua woods at Campulua, Gossweiler, 2787!

17. D. Brazzæ, Stapf. Perennial, compactly cæspitose from a short rhizome, innovations mostly intravaginal. Culms erect, 1–3 ft. high, simple, 2–4-noded, slender or somewhat stout, glabrous. Leaf-sheaths rather tight or at length loosened, the lower longer than the internodes, very closely striate, the basal densely greyishtomentose or velvety downwards, the following more or less softly hirsute to tomentose, the uppermost usually quite glabrous, all usually more or less bearded at the nodes; ligules very short, truncate, densely ciliate; blades linear to linear-lanceolate from a nearly equally wide base, tapering to an acute somewhat rigid point, 2–5 in. by $1\frac{1}{2}$ – $3\frac{1}{2}$ lin., the uppermost very much reduced, flat, firm, rigid, slightly rough along the margin, more or less his sute

to tomentose with tubercle-based hairs, midrib very fine, often not standing out from the very close and numerous lateral nerves. Racemes 2-4, rarely up to 7, sessile or subsessile, digitate, erect or suberect, moderately slender, straight or almost so, 4-6 or sometimes up to 9 in. long, dense or loose and often slightly interrupted or bare at the base, more or less silky; rhachis rather stout, straight or slightly wavy, triquetrous, $\frac{2}{5}$ in. wide, finely puberulous, angles winged (the green wings generally as wide as the flat dorsal midrib), very scabrid, internodes from 2 lin. (dense racemes) to 8 lin. (interrupted racemes); pedicels usually in fascicles of 4 or more to many (stunted branchlets), very unequal, filiform, flexuous, terete with discoid tips, smooth or slightly scaberulous downwards, the longest up to $1\frac{1}{2}$ or in large fascicles to 3 lin. long. Spikelets oblong-lanceolate, acutely and finely acuminate, $1\frac{1}{4}$ - $1\frac{3}{4}$ lin. long excluding the apical tuft of hairs, very convex on the back. Lower glume a very delicate hyaline truncate crenulate or lobed loose scale, very small to up to over 4 lin. long, usually breaking up early; upper narrow, linearlanceolate, acute, $\frac{3}{4}$ - $1\frac{1}{4}$ lin. long, appressed to the curved back of the upper floret, membranous, 3-nerved, densely hairy all over, hairs straight or almost so, appressed, acute, $\frac{3}{10}$ lin. long. Lower floret: valve corresponding in outline and size to the spikelet, thinly membranous, longitudinally (often deeply) depressed, 7-nerved, lateral nerves approximate in the broad bulging lateral flexures and distant from the slender sharply prominent smooth middle-nerve, with a marginal fringe of hairs from the middle upwards and laterally appressed tufts of hairs from the base, otherwise glabrous and smooth, hairs with firm walls and acute tips, somewhat wavy or almost straight, often purple, the basal up to as long as the spikelet, the upper from \(\frac{2}{5}\) to over 1 lin. long, produced into a brush-like point; valvule and lodicules minute. Upper floret lanceolateoblong, finely and acutely acuminate, slightly narrowed towards but not contracted at the base, as long as the lower floret, about $\frac{2}{5}$ lin. wide, chartaceous, very finely punctate-striate, whitish or at length darkening, the valve with distant margins. Anthers over $\frac{1}{2}$ lin. long. Grain oblong, plano-convex, 1 lin. by $\frac{2}{5}$ lin., whitish; scutellum elliptic, not quite half the length of the grain.—D. moninensis, Rendle in Cat. Afr. Pl. Welw. ii. 164. Panicum Brazza, Franch. Contrib. Fl. Congo Franc. 46. P. moninense, K. Schum. in Just, Jahresb. 1899, i. 457.

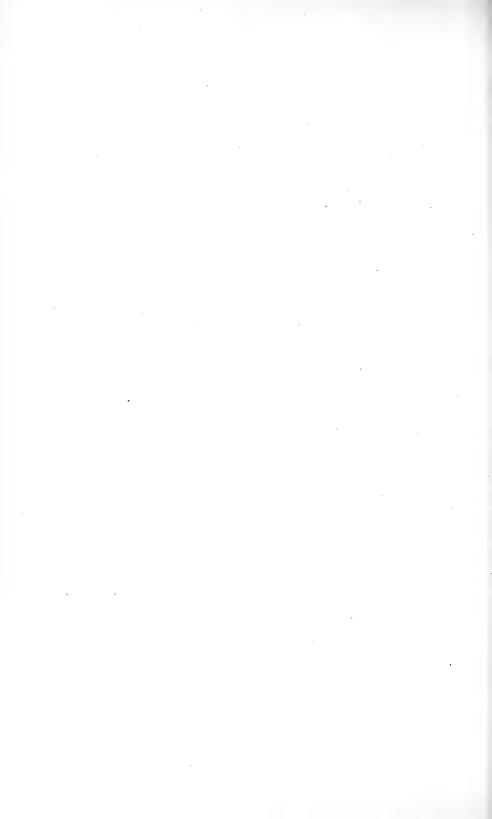
Lower Guinea. French Congo: Brazzaville, Thollon, 391! 392! Belgian Congo: Stanley Pool District; Kunzulu, Vanderyst, 5203! Kwango District; Nyungu, Vanderyst, 3224 partly! Beni; in sandy savanahs, Vanderyst, 2627! Kinsoma, Vanderyst, 3251 partly! Angola: Huilla; in rich pastures at Monino, Welwitsch, 2766!

Mozambique Distr. Rhodesia: Salisbury, Mundy! Allen, 163! Nobbs,

674! in open veldt near M'rewa, Appleton, 11 ! 23!

Good forage (Appleton). The Rhodesian specimens have on the whole larger

in this group: D. Stalgii Mez Stalz 1968 Keginbila



and more loosely disposed spikelets with longer hairs than those of the Congo; but one of Mundy's matches exactly with the latter. Welwitsch, 2676, is distinguished by more glabrous blades and glabrescent basal sheaths. D. sulcigiuma, Chiov. in Ann. di Bot. Roma, xiii. 41, is apparently this species (Katanga; Kayogo, Bovone, 86).

18. D. gayana, Stapf ex Cheval. Sudania, 163. Annual, 1-4 ft. high. Culms fascicled, erect or geniculately ascending, 4-5-noded, simple or sparingly branched below, slender, glabrous. Leafsheaths rather tight or at length loosened, the lower longer than the internodes, very closely striate, shortly hirsute, pale; ligules very short, truncate, ciliolate; blades linear from an equally wide base tapering very gradually from below the middle to an acute somewhat rigid point, 2-6 in. by 2-4 lin., or the lowest often much shorter, flat, rather rigid, rough below and along the finely cartilaginous and often crisped margins, more or less shortly hirsute to substrigose with minutely tubercle-based hairs, midrib very fine and inconspicuous, lateral nerves very numerous and close. Racemes 2-6 (rarely solitary), sessile, digitate or subdigitate with an angular rough common axis (up to 2 in. long), erect or suberect, fastigiate, slender, straight or almost so, 2-6 in. long, moderately loose, silvery silky; rhachis slender, straight or slightly wavy, triquetrous, $\frac{1}{4} - \frac{3}{10}$ lin. wide, finely puberulous, angles narrowly winged (or the green lateral wings as wide as the dorsal midrib), scabrid, internodes $1\frac{1}{2}$ -2 lin. long; pedicels 2-nate, or the lower 3-4-nate, or the lowest in more copious fascicles (stunted branchlets), very unequal, filiform, flexuous, terete, with subdiscoid tips, finely scaberulous, the longest about $1\frac{1}{2}$ lin. long (those of the basal fascicles much longer). Spikelets ovate-oblong to ovate-lanceolate, acutely and finely acuminate, $1\frac{1}{2}$ - $1\frac{3}{4}$ lin. long excluding the apical tuft of hairs. Lower glume a very delicate hyaline rotundate or truncate crenulate loose scale, up to $\frac{1}{4}$ lin. long, usually breaking up early; upper oblong-lanceolate, acute, slightly shorter than the spikelet, membranous, 3-nerved, densely hairy all over, hairs appressed, straight or almost so, acute, about $\frac{2}{5}$ lin. long. Lower floret: valve corresponding in outline and size to the spikelet, thinly membranous, longitudinally more or less depressed, 7-nerved, lateral nerves approximate in the broad bulging lateral flexures and distant from the slender sharply prominent scaberulous middle nerve, margins densely hairy, forming with the scattered and stouter hairs which spring from the spaces between the lateral nerves and on the inner side of the innermost side-nerve a silky often wavy marginal fringe which is produced beyond the acumen of the valve into a long brush-like point, hairs with firm walls and acute tips; valvule and lodicules very minute. Upper floret ovate-oblong, finely and acutely acuminate, shortly contracted at the base, slightly shorter than the lower floret, $\frac{1}{5}$ lin. wide, thinly chartaceous, very finely granular-punctate, faintly 3-nerved, pale brown, margins of valve somewhat distant. Anthers ½ lin. long.—Panicum gayanum, Kunth, Rév. Gram. i. 239, t. 31;

Enum. Pl. i. 79; Hook. Niger Fl. 560; Steud. Syn. Pl. Glum. i. 42; Durand & Schinz, Consp. Fl. Afr. v. 750. *P. didymostachyum*, Steud. l.c. 97.

Upper Guinea. Senegal: Kouma, Roger, 56! Cayor, Heudelot, 446!

Galaithiame, Lepricur! Dahomey, Newton! Southern Nigeria: Lagos Island,
Dalziel, 1128! Northern Nigeria: Lokoja, Richardson! Stirling, Vogel, 163!
Nupe, in cultivated ground, Barter, 718! Baikie! Sokoto Province; Dalziel,
501! Bornu; Mora, Vogel, 55!

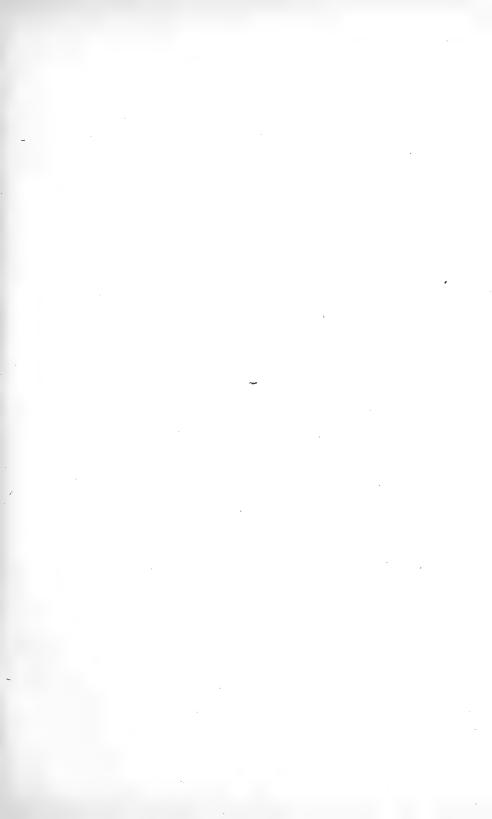
North Central. Bagirmi: Massenia, Chevalier, 9619!

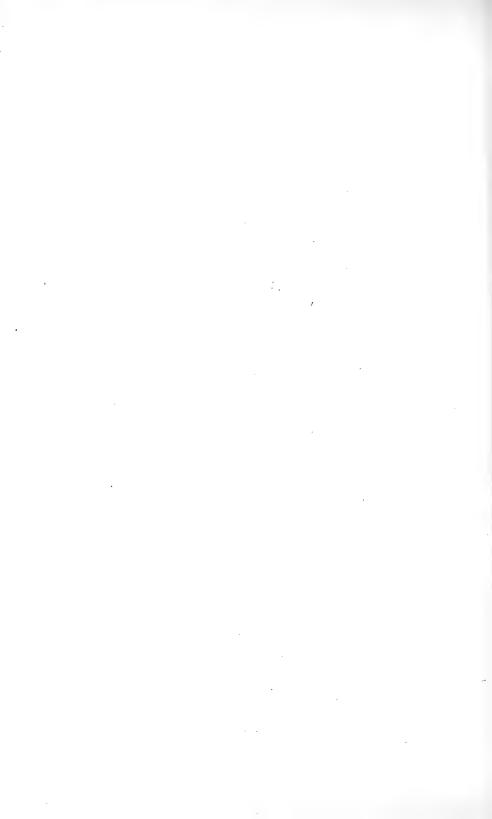
Nile Land. Sudan: Cordofan; Om Marba, Pfund, 169! British East

Africa: Kibwezi, Scott Elliot, 6209!

Lower Guinea. Belgian Congo: Kwango District; Bagata, Vanderyst, 2617! Taka, Vanderyst, 3410! Baya, Vanderyst, 2623! between Katschaka and Lutschima, Vanderyst, 3836! Kassai District; Lusambo, diseased, Laurent.

(Pilger) 19. D. Lecardii, Stapf. Annual (?). Culms (base unknown) over $2\frac{1}{2}$ ft. high, erect, slender, simple or with a branch from one of the lower nodes, apparently few-noded, the uppermost internode very long and long-exserted, glabrous, rough towards the inflorescence. Leaf-sheaths somewhat loose, finely striate, glabrous except at the loosely bearded nodes, or sparingly and finely hairy; ligules reduced to a membranous ciliolate rim with some long hairs from the back; blades linear from an equally broad base, 6-9 in. by $1\frac{1}{2}$ -2 lin., flat, flaccid, rough, particularly above and upwards, glabrous or with a few very fine hairs near the base, midrib very slender, lateral nerves somewhat fine, close. Racemes 2-4, sessile, compound, at least in the lower part, subdigitate or with a slender rough common axis $(1-1\frac{1}{2} \text{ lin. long})$, slender, erect or obliquely erect, straight, rather loose, 4-6 in. long; rhachis slender, triquetrous, $\frac{1}{5}$ lin. wide, straight or slightly wavy, finely puberulous, lateral angles marginate, scabrid, internodes 1½-2 lin. long; pedicels in the upper part 3-4nate, lower down fascicled with short sparingly spiculiferous branchlets, 3-6 (rarely up to 15) lin. long, very slender, angular, scabrid, often with a few very short hairs, the longest usually 1-2 lin. long. Spikelets oblong to ovate-oblong, acute, about 1 lin. long, pale or whitish-green with silky sides when young, at length greyish-green with a rufous fringe. Lower glume indicated by a very minute hyaline irregular rim at the base of the lower floret, or 0; upper lanceolate or narrowly oblong, acute or subacute, about $\frac{7}{10}$ lin. long, very thin, 3-nerved, densely and at length spreadingly hairy all over, hairs slightly curved or straight, with short very acute points. Lower floret corresponding in outline and size to the spikelet: valve firmly membranous, slightly depressed and glabrous between the innermost side-nerves, 7-nerved, middle-nerve very slender, smooth, side-nerves approximate on the slightly bulging and rounded-off sides, with dense lines of hairs between the inner side-nerves (of each half) and along the margin, hairs as in the upper glume, if not longer and more rigid, with usually a few additional large almost bristlelike hairs from the inner line, forming at length a conspicuous rufous





spreading fringe; valvule and lodicules minute. Upper floret broad-lanceolate, acute, early brown, at length almost black, shining, chartaceous to subcoriaceous, finely punctate-striate. Anthers oblong, about $\frac{1}{8}$ - $\frac{1}{6}$ or $\frac{2}{5}$ (Barter, 1370) lin. long, with papillose bases. Grain elliptic-oblong, plano-convex, $\frac{6}{10}$ lin. by $\frac{1}{3}$ lin., white; scutellum elliptic, equalling half the grain.—P. sanguinale, var. Lecardii, Pilger in Engl. Jahrb. xxx. 118.

Upper Guinea. French Sudan: Segou, on dry land, Lécard, 243! Fada n'Koufala, Chevalier, 24556! Northern Nigeria: Nupe, Barter, 1370! 1358! Yola, very common in bush, Dalziel, 274!

Good fodder according to Lécard.

I found the anthers of the small type always tightly enclosed in the floret and entangled in the scanty hairs of the stigmas. They hold comparatively little, but apparently perfect, pollen.

(Hack,) 20. D. xanthotricha, Stapf. Annual, 2-3 ft. high. Culms erect or geniculate-ascending, simple or with a branch from the base, very slender, 3-4-noded with the uppermost internode by far the longest, terete, glabrous. Leaf-sheaths tight, terete, shorter than the internodes, glabrous or more or less hirsute with short tubercle-based hairs; ligules very short, truncate, ciliate, brown; blades linear from an equally wide base, long-tapering to an acute point, 2-4 in. by $1\frac{1}{2}-2\frac{1}{2}$ lin., thin, glabrous, smooth except at the slightly rough cartilaginous margins, nerves numerous, close, midrib slender somewhat prominent below, obscure above. Racemes 2, one sessile, the other shortly peduncled, or 3-4, sessile, subdigitate, slender, 3-7 in. long, dense or somewhat lax; rhachis filiform, triquetrous, $\frac{1}{5}$ lin. wide, angles narrowly marginate, scabrid, glabrous, internodes about 1½ lin. long; pedicels 2-nate or 3-4-nate, unequal, the longest up to $1\frac{1}{2}$ lin. long, filiform, compressed, scabrid with a short beard of pale green or at length yellowish hairs. Spikelets subimbricate or in slightly distant clusters, lanceolate-oblong to lanceolate, acute, $1\frac{1}{4}$ lin. by $\frac{2}{5}$ lin. (excluding the apical hairs), pale yellowish or tinged with purple. Lower glume suppressed; upper linear-lanceolate, much narrower than the spikelet, acute, slightly shorter than the spikelet, membranous, 3-nerved, appressedly and densely hairy between the nerves and along the margins, hairs rather rigid with sharp points. Lower floret corresponding in outline and size to the spikelet: valve membranous, 3-nerved (or the submarginal nerve splitting at the base into 2 strands), with a transverse fringe of hairs above the base and a dense marginal one on each side, otherwise glabrous or with decurrent lines of hairs. below the transverse fringe which thereby becomes less conspicuous, the hairs like those of the upper glume but rather longer (\frac{1}{2} lin.), at first tightly appressed, ultimately rigidly spreading; valvule and lodicules minute. Upper floret ovate-lanceolate, acutely acuminate, equalling the spikelet; valve chartaceous, 3-nerved, seriately

punctate, pale when ripe. Anthers $\frac{3}{4}$ lin. long. Grain broadoblong, acute, 1 lin. long, whitish, plano-convex; scutellum elliptic, less than half the length of the grain.— $Panicum\ xanthotrichum$, Hack. in Oest. Bot. Zeitschr. 1901, 333.

North Central. Shari Territory: Bagas country; on the left bank of the Tomi River, Chevalier, 5602!

Nile Land. Jur: Ghattas' Great Seriba, Schweinfurth, 2303! 2380!

Hackel in Oest. Bot. Zeitschr. 1901, 366, describes a Panicum Schweinfurthii, based on no. 2303 of Schweinfurth's collection. The Kew specimen of no. 2303 is clearly a younger and more robust state of no. 2380. The latter was evidently growing in dense masses—the Kew sample of it consists of over a dozen individuals which seem to have been pulled up together—and was collected in the same locality a month later, in the fruiting state. Dense growth would account sufficiently for the more slender and meagre condition of the specimens of no. 2380, whilst such differences as exist in the condition of the spikelets appear to be solely due to age. On the other hand, Hackel describes the spikelets of his P. Schweinfurthii as longitudinally depressed or subsulcate and appressedly hairy and ciliate towards the margins with the cilia gathered into a brush-like point extending beyond the body of the lower floret, and he adds, in a note, that the groove of its valve is glabrous as in Digitaria gayana. It will be necessary to compare Hackel's original to explain the discrepancy. Chevalier's 5602 matches exactly with Schweinfurth's 2303.

(Rich.) 21. D. ternata, Stapf in Dyer, Fl. Cap. vii. 376. Annual. Culms fascicled, erect from a geniculate base, slender, simple, rarely branched low down, $\frac{1}{2}$ -2 ft. long, glabrous or more or less beset with long fine spreading hairs below the racemes, about 2-noded. Leaf-sheaths often slightly loose, glabrous, smooth: ligules short, membranous, truncate; blades linear-lanceolate to linear, acute, 2-9 in. by 3 lin., flat, flaccid, glabrous or sparingly beset with fine spreading hairs particularly towards the base, midrib very slender, primary nerves about 4 on each side, often indistinct. Racemes 2-7, sessile, subdigitate, with a short common rhachis, erect or spreading, very slender, straight, 2-6 in. long, usually rather dense, greyish-green; rhachis straight or slightly wavy, $\frac{1}{4}$ to almost $\frac{1}{2}$ lin. wide, subtriquetrous, more or less winged, wings herbaceous, scabrid, midrib obtuse on the back, very slender and raised on the face towards the insertion of the pedicels into an acute ridge; internodes usually not over 1 lin. long; pedicels 2-3-nate, very unequal, the longest up to 1 lin. long, very slender, angular, scabrid, hispidulous towards the hardly thickened tips, the hairs forming a short terminal tuft or beard. Spikelets appressed, subimbricate, oblong-elliptic, obtuse or subobtuse, 1 lin. long, pale. Lower glume 0; upper linearoblong to linear-lanceolate, acute or obtuse, shorter and narrower than the upper floret, 3-nerved, with 4 fine lines of appressed or somewhat loose clavate-tipped hairs, $\frac{1}{10} = \frac{1}{7}$ lin. long. Lower floret: valve oblong-elliptic, subobtuse, membranous, as long as the spikelet, prominently 5-nerved, with lines of hairs in all the spaces between the nerves and along the margins, or the inner 2 spaces glabrous, hairs appressed or loose and shaggy towards the tip of the valve,

Chevalier 5602 is typecale of D. alla Mg



clavate-tipped, thick-walled; valvule a delicate papillose scale up to $\frac{1}{8}$ lin. long, exceeding the lodicules. Upper floret oblong, subacute, up to 1 lin. by about \(\frac{2}{5} \) lin., very early dark brown to black, the valve with broad whitish hyaline more or less distant margins. Anthers \frac{1}{2} lin. long. Grain white, elliptic in outline, dorsally somewhat compressed, $\frac{4}{5}$ lin. by almost $\frac{1}{2}$ lin.; scutellum elliptic, equalling half the length of the grain.—Rendle in Cat. Afr. Pl. Welw. ii. 162. Panicum ternatum, Hochst. in Flora, 1841, i. Intell. 19; Steud. Syn. Pl. Glum. i. 40; Engl. Hochgebirgsfl. Trop. Afr. 118; Durand & Schinz, Consp. Fl., Afr. v. 766; Hack. in Oest. Bot. Zeitschr. 1901, 331; Chiov. in Ann. Istit. Bot. Roma, viii. 30, 293. P. phæocarpum, var. gracile, Nees, Fl. Afr. Austr. 23. Cynodon ternatum, A. Rich, Tent. Fl. Abyss. ii. 405. Paspalum ternatum, Hook. f. Fl. Br. Ind. vii. 17.

Upper Guinea. French Guinea: Timbo, Pobéquin! Nile Land. Eritrea: Amasen, 3300-7200 ft., Pappi, 121, 244, 2171, 2269, 4278, 4479, 4779, 5007; *Tellini*, 359, 1726. Assaorta: Mount Dijot, *Pappi*, 2975; Sarae, 5570–7200 ft., *Pappi*, 167, 356. Ocule Cusai, 5250–8500 ft. *Pappi*, 1366, 1815, 1824. Scimezana, 7200–8100 ft., *Pappi*, 719, 844. 881, 921. Abyssinia: Tigre; in Teff fields near Adowa, Schimper, 76! Samen; Mai Sigamo, 6000 ft., Schimper, 986! and without precise locality, Schimper, 819! Uganda: in grassland near Kiyanza, 4000 ft., Dummer, 1200! British East

Africa: Njoro, Dowson, 223! Angola: Pungo Andongo; meadows between Bumba Lower Guinea.

and N'billa, Welwitsch, 7436!

Mozambique Distr. Rhodesia: Victoria Falls, Rogers, 13281! Mashonaland; Red Highlands, Allen, 704! Salisbury, Mrs. Craster, 23! Mazoe District, Mundy! Umtali, Sawer, 24! North Transvaal: Mailas Kop, 3600 ft., Schlechter, 4557!

Also in Eastern Cape of Good Hope, Natal and Transvaal (Pretoria, Rehmann, 4045), and in India, Burma and Yunnan.

All the Rhodesian specimens have long fine hairs on the peduncles, but such hairs are also found occasionally in South African and Indian specimens.

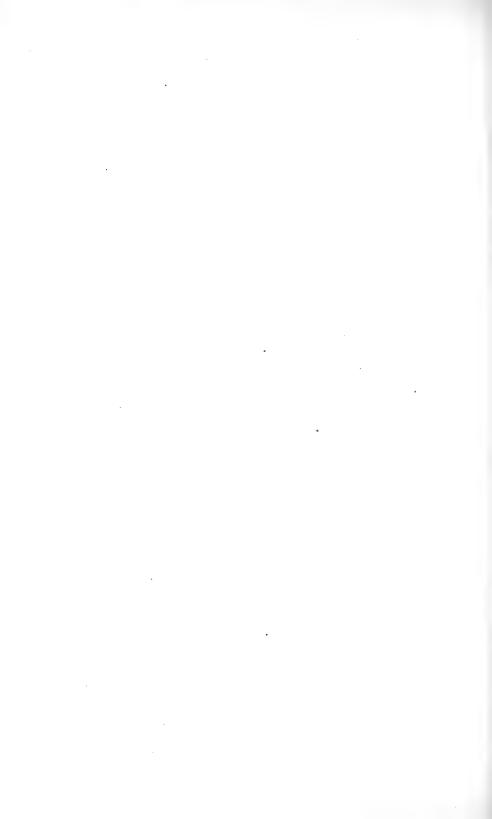
22. D. melanochila, Stapf. Annual, over 1½ ft. high. Culms erect, sometimes subgeniculate, fascicled, very slender, smooth, glabrous, compressed or sulcate when dry, usually 3- or sometimes 4-noded, the uppermost internode very long-exserted. Leaf-sheaths somewhat loose or the upper tight, thin, glabrous, smooth, striate, the lower more or less purplish; ligules scarious, rounded, short, glabrous; blades 2-4 in. by 1-2 lin., flaccid, glabrous except for a usually scanty beard of fine spreading hairs behind and above the ligule, midrib slender, lateral nerves very fine or obscure. Racemes 4 or 5, sessile, subdigitate with a short slender common rhachis, erect, straight or slightly arching, very slender, about 3 in. long, olive-green, speckled with black, somewhat loose; rhachis very slender, straight, subtriquetrous, $\frac{1}{5}$ lin. wide, with herbaceous sides and scabrid margins, midrib subconvex and smooth on the back, very fine and more or less raised and acute on the face; pedicels in clusters of 4 or 3 in the lower part of the raceme, 2- or 3-nate upwards, finely filiform, unequal, the longer about $\frac{1}{2}$ lin. long, more or less angular, scaberulous upwards with a few minute rigid hairs round the subdiscoid tips. Spikelets appressed, subimbricate or more scattered (the pairs or groups of spikelets up to 2 lin. apart), elliptic-oblong, subobtuse, $\frac{2}{3}$ lin. by $\frac{1}{3}$ lin., olive- to greyish-green with black more or less semilunar sides, finely hairy. Lower glume quite obsolete or the merest rudiments of a hyaline membrane; upper very delicate and easily rubbed off, ovate-oblong, obtuse, up to $\frac{2}{5}$ lin. long, 3-nerved, with 4 lines of short clavate rather thickwalled hairs. Lower floret: valve elliptic-oblong, subobtuse, as long as the spikelet, finely but distinctly 5-nerved, hyaline, with a line of short clavate hairs along each side of the inner side-nerves and a marginal fringe of similar but shorter hairs, these often pale rufous, particularly upwards; valvule and lodicules microscopic. Upper floret elliptic-cblong, acute, as long as the spikelet, the back incompletely covered by the upper glume or soon quite bare and almost black from an early stage, chartaceous, rather tough, the valve with contiguous or slightly distant white margins. Anthers $\frac{1}{7}$ lin. long. Grain white, elliptic in outline, slightly compressed from the back, $\frac{1}{3}$ lin. by over $\frac{1}{5}$ lin.; scutellum indistinctly marked off, almost half the length of the grain.

Nile Land. Uganda: grassy swamps near Kiwapu, 4000 ft., Dummer, 1068! British East Africa: without precise locality, Powell, 18! 20 bis!

The black often semilunar markings along the sides of the face of the spikelets (lower floret) to which the name of the species is meant to allude, are due to the transparency of the glabrous spaces just within the submarginal nerves and the dark colouring of the fertile floret underneath it.

23. D. delicatula, Stapf. Annual, up to 2 ft. high. Culms erect or slightly geniculate, branched from near the base, the branches forming secondary culms like the primary and forming with them scanty fascicles, all the culms very slender, very smooth, shining, glabrous, about 4-noded, the uppermost internode at length longexserted, the others shorter or only slightly longer than the sheaths. Leaf-sheaths thin, somewhat loose and the lower often slipping off the internodes, coarsely striate, finely strigillose or hirsute (the upper), scantily bearded at the nodes; ligules very short, truncate, ciliolate; blades narrowly linear, long-tapering to a fine point, 4-9 in. by less to slightly more than 1 lin., flexuous, flat or loosely convolute, more or less rough, at least upwards, shortly and sparingly hirsute or copiously so at the base above the ligule, midrib very slender, lateral nerves very fine and close, the primary (2 on each side) slightly more raised. Racemes mostly 2-3, rarely 4, sessile, or bare at the base for a short distance owing to the arrest of the spikelets, on a very slender subangular common rhachis (3 to over 1 in. long), erect or oblique, flexuous, very slender, about 3 in. long, pale grevish-green in flower, rather loose; rhachis slightly wavy,





filiform, triquetrous, $\frac{1}{7} - \frac{1}{5}$ lin. wide, angles marginate, scabrid, internodes 1½ lin. long; pedicels 2-nate, finely filiform, very unequal, the longer up to over $1\frac{1}{4}$ lin. long, very angular, scabrid, sometimes with obscurely ciliate tips. Spikelets loosely appressed, subimbricate in flower or usually more loosely disposed, oblong, acute, $\frac{2}{3}$ -1 lin. long, pale greyish-green, finely rufously hairy on the sides and towards the tips. Lower glume a very minute and usually obscure cuff-like hyaline membrane, early disappearing; upper very thin, narrowly lanceolate or narrowly oblong, subacute, distinctly shorter than the spikelet (about $\frac{3}{5}$ lin. long), delicately 3-nerved, with 4 lines of appressed or loose and obliquely spreading hairs, the tips of the latter clavate with a sharp apiculus and usually pale rufous, sometimes mixed with much finer, upwards not widened circinate hairs. Lower floret: valve oblong, subacute or acute, as long as the spikelet, sub-7-nerved, the spaces between the midrib and the inner lateral nerves glabrous, turning olive-green, the next outer spaces and the margins with lines of clavate acutely apiculate upwards pale rufous short hairs, the hairs not or scarcely exceeding the tips, up to $\frac{1}{10}$ lin. long; valvule a minute hyaline scale up to $\frac{1}{7}$ lin. long; lodicules minute. Upper floret as long as the spikelet, lanceolate, acute, the back very imperfectly covered by the glume, soon rich chestnut-brown, thinly chartaceous, margins of valve whitish, contiguous nearly all along. Anthers \(\frac{1}{4}\) lin. long.

Upper Guinea. Ivory Coast: Adioukrou country; Dabou, Chevalier, 17149! Southern Nigeria: along water near Lagos, MacGregor, 210!

24. D. Iburua, Stapf in Kew Bulletin, 1915, 382. Annual. Culms erect, over 1½ ft. high, simple, 4-5-noded; internodes enclosed in the sheaths except the uppermost. Leaf-sheaths tight, striate, glabrous, smooth, the lower keeled upwards; ligules membranous, rounded, broad, 1-1½ lin. long; blades linear, long and finely tapering upwards, up to 1 ft. by 5 lin., flat, with some long hairs near the base from behind the ligule, midrib slender, primary lateral nerves about 6 on each side. Raceme subcomposite, 4-10, sessile, digitate, the lowest usually somewhat distant from the others which are closely crowded, subcreet, 5-51 in. long, dense, pale green; rhachis straight, triquetrous, about ½ lin. wide, angles green, narrowly winged, scaberulous; secondary racemes appressed, up to $2\frac{1}{2}$ lin. long, bearing up to 5 spikelets; pedicels 2-5-nate, unequal, the longest up to 14 lin. long, finely filiform, angular, scaberulous, tips ciliate. Spikelets tightly imbricate, elliptic-lanceolate to oblong, acute, up to 1 lin. long, ½ lin. wide when mature, quite glabrous. Lower glume a minute hyaline membrane, soon breaking up, or 0; upper ovate-oblong, subobtuse, $\frac{3-2}{8-3}$ lin. long, hyaline, finely 3-nerved. Lower floret: valve membranous, as long as the spikelet, 7-nerved, the 3 inner nerves parallel, approximate and prominent, the outer in pairs at the flexures; valvule almost microscopic, broad,

emarginate-truncate. Upper floret thinly chartaceous, equalling the lower floret, margins of valve parallel, widely distant. Anther $\frac{1}{2}$ lin. long. Grain ellipsoid, slightly compressed from the back, $\frac{3}{4}$ – $\frac{7}{8}$ lin. by almost $\frac{1}{2}$ lin., very tightly enclosed by the delicate pale to dark dull brown husks; scutellum elliptic, not quite reaching to the middle of the grain.—Stapf in Hook. Ic. Pl. t. 3069. "Iboru," Dudgeon, Agric. & Forest Prod. British West Afr. 149.

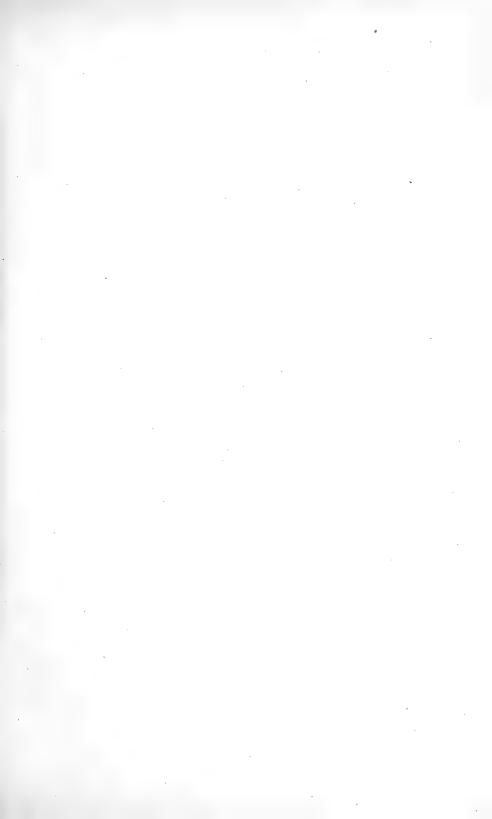
Upper Guinea. Northern Nigeria: Hausa States; cultivated at Zaria, Lamb, 54!

Hausa name "Iburu" or "Iboru." Grown along with millet.

25. D. botryostachya, Stapf. Perennial, with a branched rather stout rhizome emitting more or less discrete flowering and barren shoots from plump extravaginal innovation buds covered with greyish-tomentose short broad cataphylls. Culms slender, erect, up to 1 ft. high, glabrous, with a single subbasal node, uppermost internode long-exserted. Leaves glaucous; sheaths tight, finely striate, glabrous or the lower minutely hairy or scaberulous between the nerves; ligules short, scarious, glabrous; blades linear, long-tapering to a fine point, of the basal leaves 3-5 in, long, of the cauline much shorter, 2-2½ lin. wide, flat, glabrous with some long fine spreading white hairs towards the base, margins cartilaginous, sometimes crisp, scaberulous upwards, lateral nerves numerous, very close and fine. Racemes 6–10, racemosely disposed on a slender upwards angular common rhachis 2-3 in. long, obliquely erect, solitary, $\frac{3}{4}$ -1 in, long, straight, the lower bare at the base or with arrested barren pedicels, glaucous; rhachis very slender, up to $\frac{1}{5}$ lin. wide, triquetrous, angles finely marginate, scaberulous to scabrid; pedicels 2-nate, filiform, angular, scaberulous, unequal, the longer \(\frac{3}{4} \) lin. long. Spikelets appressed, imbricate, lanceolate-oblong, acute to subacute, 11 lin. long, more or less silky on the sides, pale. Lower glume delicately hyaline, rounded, ½ lin. long, soon disappearing; upper oblong, obtuse, or almost so, 1 lin. long, 5-nerved with a line of hairs on each side of the midrib and along the margins, marginal hairs much longer, up to $\frac{1}{8}$ lin. long, very fine, slightly curled, with obtuse tips. Lower floret: valve lanceolate-oblong, acute to subacute, $1\frac{1}{4}$ lin. long, 7-nerved, the inner 2 side-nerves on each side approximate with a line of usually appressed hairs between them, a fringe of often spreading white hairs along the margins, hairs as in the upper glume, the marginal up to over \(\frac{1}{3}\) lin. long; valvule and lodicules minute. Upper floret lanceolate, shortly acuminate, very acute, $1\frac{1}{4}$ lin. by $\frac{2}{5}$ lin., thinly characeous, chestnut-brown. Anthers ½ lin. long. Stigmas orange.

Nile Land. Abyssinia: Arussi Country; Ardaga, Drake-Brockman, 131!

This is possibly the plant which Chiovenda described and figured, from an nflorescence, as Panicum Rivæ in Ann. Istit. Bot. Roma, vii. 62, fig. ii. (Digitaria Rivæ, Stapf in Kew Bulletin, 1907, 213; Chiov. in Result. Scient. Miss.





Stefanini-Paoli, i. 183, 224, 225). It was collected by Riva (no. 303) in the Ogaden desert, south or south-west of the Arussi country, by Provenzale at Merca, and by Paoli at Balaad on the Web Shebeli, both in Southern Italian Somaliland. The inflorescence figured is 8 in. long and bears 25–30 racemes with solitary or 2–3-nate spikelets the longest of whose pedicels equal the spikelets. Chiovenda also describes the barren valve as 5-nerved, but this may be due to oversight.

26. D. gazensis, Rendle in Journ. Linn. Soc. Bot. xl. 228, t. 6, figs. 1-5. Perennial, compactly exspitose on a short stout præmorse rhizome; innovations extra- and intravaginal. Culms erect, moderately stout, 2\frac{1}{2}-4 ft. high, glabrous, 2- (rarely 3-) noded, simple. Leafsheaths rather tight, the lowest at length often slipping off the culm, finely striate, the intermediate and upper shorter to much shorter than the internodes, the lowest softly hirsute, at least downwards, with generally densely villous bases which persist more or less, the sheaths otherwise glabrous except for a ring of long soft silky hairs at the nodes; ligules scarious to membranous, rounded, up to 1 lin. long, glabrous; blades linear, tapering to a fine point, up to 6 in. by 12-32 lin., flat, flexuous, green, often drying dark brown, glabrous or more or less hairy from pubescent to hirsute, particularly towards the ligule, margins slightly rough to smooth, lateral nerves numerous, fine, close, primary nerves 5-6 on each side standing out from the rest on the upper side or merged among them. Racemes numerous, often over 10, subdigitate, simple or sometimes compound, particularly towards the base, with short secondary racemes, solitary or the lower usually 2-4-nate, often bare at the base for up to over 1 in. with distinct traces of arrested spikelets, or bearing spikelets all along, with a slender often almost filiform angular common rhachis, 1 to over 3 in. long, erect or suberect, 4-7 in. long, strict or subflexuous, very slender, somewhat loose or at any rate not closely imbricate, pale green to purplish-grey or violet; rhachis very slender to filiform, $\frac{1}{8}$ lin. wide, triquetrous, with some long fine spreading hairs in the lower part, angles fine, scabrid, green or purple; pedicels 2-3nate or solitary in the secondary racemes, finely filiform, angular, scabrid, unequal, the longer about 1 lin. long. Spikelets loosely appressed, the superposed distant by more than their own length, elliptic-oblong, subobtuse to subacute, up to over 1 lin. long, slightly silky or apparently glabrous on the sides. Lower glume a very delicate hyaline cuff-like scale up to almost \(\frac{1}{10}\) lin. long, soon disappearing; upper narrowly oblong, subobtuse to acute, of the length of the spikelet, 5-nerved, with a line of hairs on each side of the middle nerve and along the margin, hairs very fine, curled upwards, with obtuse tips, often purplish, those of the margin longer (up to $\frac{1}{4}$ lin.). Lower floret: valve similar to the upper glume, but 7-nerved, the inner 2 side-nerves on each side approximate with a line of appressed hairs between them, marginal hairs or cilia also more or less appressed, directed forward, very slightly exceeding the tip; valvule a hyaline scale up to $\frac{1}{2}$ lin. long, slightly exceeding the

...

minute lodicules. Upper floret chartaceous, broad-oblong, shortly acute, 1 lin. by $\frac{1}{2}$ lin., pale or purplish. Anthers $\frac{3}{4}$ lin. long. Grain elliptic-oblong in outline, $\frac{3}{4}$ lin. by $\frac{1}{3}$ lin., subelliptic in cross section, whitish; scutellum broad-elliptic, not quite half the length of the grain.—D. sanguinalis, var. interrupta, Rendle in Cat. Afr. Pl. Welw. ii. 164.

Lower Guinea. Angola: Country of the Ganguellas and Ambuellas; at Domba, Kuanarol, Gossweiler, 3056! 3755! Huilla; Humpata, Newton, 26!

grassy hills near Lopollo, Welwitsch, 2675!

Mozambique Distr. Portuguese Éast Africa: in woods near Beira, Swynnerton, 1593! Nyasaland: Zomba, 4000–5000 ft., Whyte! and without precise locality, Buchanan, 1449! Rhodesia: at Makanga by the N'Yenyeshi River (16° 30' N. Lat.; 28° 40' E. Long.), Küssner, 2220! M'rewa, in bush, Appleton, 14! Buluwayo and Matoppo Hills, Appleton, 7! Mashonaland; North Mazoe District, Mundy! Inyanga, Mundy! Salisbury, Mundy! Somnabula, Nobbs 656! Gazaland: near Chirinda, 3800 ft., Swynnerton, 1630!

27. D. Chevalieri, Stapf in Chev. Sudania, 13 (name only). Perennial (apparently flowering the first year), forming dense tufts of barren shoots mixed with flowering culms and trailing runners; rhizome short, præmorse; innovations extravaginal, covered with silky-tomentose cataphylls; runners slender, many-noded, up to 6 in. long, with tufts of short leaves from the nodes. Culms erect from an ascending or shortly prostrate base, slender, about $\frac{3}{4}-1\frac{1}{2}$ ft. high, simple or with a leafy branch here and there, 8- or more-noded or in first year's specimens only 3- or 4-noded, all the internodes except the upper 2 or 3 shorter than the short sheaths, $\frac{1}{3} - \frac{2}{3}$ in. long, the uppermost very long and long-exserted, glabrous. Leaf-sheaths tight or the lower, which are very short loose, terete or subterete, densely and softly hairy to villous, bearded at the base, the uppermost quite glabrous upwards, hairs spreading, white, fine; ligules short, membranous, rounded; blades linear, tapering to an acute point, those of the culms more or less spreading, 1 to almost 3 in. by $1\frac{1}{2}$ -2 lin., flat, soft, glaucous, more or less loosely villous, hairs very fine, margins cartilaginous, scaberulous to spinulously scabrid, lateral nerves obscure or the primary (3 or 4 on each side) slightly prominent. Racemes about 6-10, sessile or subsessile, subdigitate or racemosely arranged with a slender scabrid angular common rhachis (up to 2 in. long), sometimes slightly compound near the base, erect or more or less spreading, very slender, straight, rather loose, about 3 in. long, pale green; rhachis slightly wavy, filiform, triquetrous, $\frac{1}{10} - \frac{1}{8}$ lin. wide, with or without some long extremely fine spreading hairs in the lower part, angles finely marginate, very scabrid, internodes 1½-2 lin. long; pedicels 2-3-nate, or fascicled near the base with very short and scanty secondary branchlets, finely filiform, very unequal, the longer up to $1\frac{1}{2}$ lin. long, angular, scabrid. Spikelets more or less appressed, not imbricate, oblong, subacute, \(\frac{3}{4}\) lin. long, pale greyish- or brownish-green, delicately silvery-silky. Lower glume a very minute cuff-like hyaline





membrane, early disappearing; upper thin, oblong with a delicate hyaline obtuse (flattened out) tip, as long as the spikelet, delicately 5-nerved with 4 lines of extremely fine silvery hairs, hairs curled or circinate upwards. Lower floret: valve similar to the upper glume but broader and finely 7-nerved, the spaces between the midrib and the more prominent innermost side-nerves glabrous, hairs equalling but not exceeding the tips, up to $\frac{1}{7}$ lin. long; valvule and lodicules very minute. Upper floret as long as the spikelet, narrowly oblong, subacute, the sides slightly exposed when ripening, pale to brownish when ripe, thinly chartaceous. Anthers $\frac{1}{2}$ lin. long.

Upper Guinea. French Sudan: Dendela, Chevalier, 629! Ivory Coast: Bingerville, along roads, Chevalier, 16003! Southern Nigeria: Lagos Island, Dalziel, 1123! MacGregor, 157 partly! Northern Nigeria: Lokoja, Richardson!

Chevalier's specimens from Bingerville evidently represent a first year's growth, although they are in flower. They form tufts of flowering culms and leafy shoots with a few young trailers. The leafy shoots and the trailers might be assumed to grow into flowering culms later in the season, and if so the grass would have to be considered as an annual. Chevalier's Dendela specimen, however, possesses unmistakable innovation-buds covered with short silky-tomentose cataphylls and similar cataphylls, are found at the base of one of the detached culms of Dalziel's specimen. The Bingerville specimens were collected in the middle of December, the Dendela one at the end of March.

(Filger)
28. D. Hackelii, Stapf. Perennial, with slender creeping stolons, their short and appressedly pubescent internodes covered with tight rather firm obtuse closely nerved, at length glabrescent, brown cataphylls. Culms ascending or prostrate at the base, 7-12-noded, simple for the short first 3-5 internodes, then usually branched from the next 1-3 nodes, branches erect, often as long as the primary culm and resembling it, forming a loose scanty fascicle with it, uppermost internodes very long. Leaf-sheaths terete, rather tight, the lower and intermediate, particularly at the branching nodes, at length slipping off, somewhat thin, finely and sparingly hirsute, hairs spreading, tubercle-based; ligules scarious, short; blades linear, tapering to an acute point, 2-3 in. by $1\frac{1}{2}-2\frac{1}{2}$ lin., thin, somewhat flaccid, green, loosely hirsute, hairs like those of the sheaths, sometimes 2 from a common tubercle, midrib prominent, slender, lateral nerves obscure. Racemes 2-5, sessile, subdigitate with a short slender common rhachis, erect, straight or nearly so, very slender, somewhat loose, 2-3 in. long; rhachis very slender, slightly wavy, triquetrous, $\frac{1}{8}$ lin. wide, with scattered long extremely fine hairs, angles marginate, scaberulous, internodes $2-1\frac{1}{2}$ lin. long; pedicels 2-nate, filiform, angular to subangular, scaberulous, unequal, the longer up to 1 lin. long. Spikelets loosely appressed, oblong to elliptic-oblong, acute, 1 lin. long, pale, almost glabrous. Lower glume membranous or subhyaline, truncate, embracing the spikelet like a cuff, $\frac{1}{10} - \frac{1}{8}$ lin. long; upper as long and as broad as the spikelet, firmly membranous, more or less prominently 5-nerved, glabrous or with a narrow marginal fringe of hairs, hairs fine, slightly curled

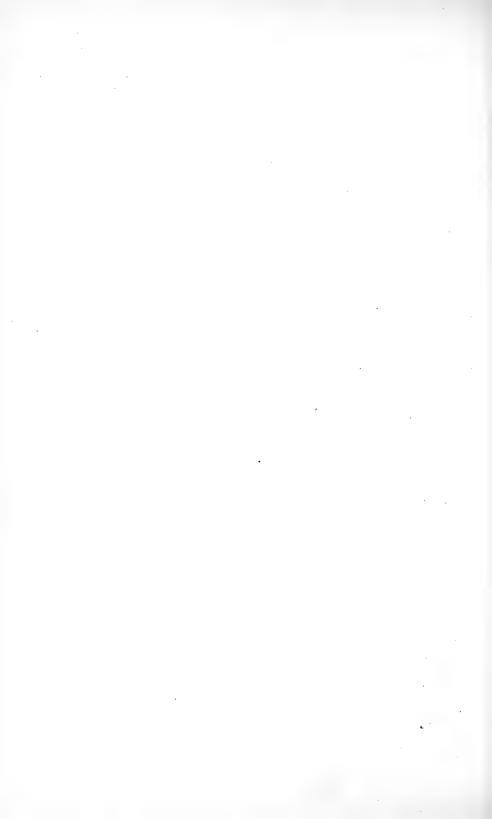
upwards, with obtuse but not clavate tips, appressed, very slightly exceeding the tip of the valve, often purplish. Lower floret: valve very similar in shape, size and hairiness to the upper glume, 7-nerved, nerves equidistant, sometimes an imperfect line or tufts of hairs in the space between the inner lateral nerves of each half; valvule and lodicules very minute. Upper floret ovate-elliptic in outline, shortly acute, $\frac{7}{10} - \frac{1}{5}$ lin. by $\frac{2}{5}$ lin., pale, margins of valve widely gaping. Anthers deep purple, $\frac{3}{5}$ lin. long.—Panicum Hackelii, Pilger in Engl. Jahrb. xxx. 118.

Lower Guinea. Gaboon: Munda District; Sibange Farm, Soyaux, 425! Belgian Congo: Lower Congo, Smith!

Smith's plant differs from the original in having the spikelets quite glabrous, but in no other way.

29. D. abyssinica Stapf in Kew Bulletin, 1907, 213. Perennial, with a long slender creeping often branching rhizome; cataphylls scarious, strongly striate, early decaying down to the pubescent or villous base; distal innovations extravaginal, subterminal intravaginal growing out into fascicles of barren and flowering shoots. Culms usually more or less geniculate, ascending, or sometimes prostrate at the base, very slender, ½-1 ft. high, rarely much higher, glabrous, 2-4- or if the base is prostrate more-noded, lowest internodes short, terete, simple or branched below. Leaf-sheaths rather tight, the lower more or less compressed and keeled, sometimes at length slipping off the culm, glabrous or with a few spreading hairs, subherbaceous; ligules scarious, rounded, up to 2 lin. long, usually much shorter, glabrous; blades linear, tapering to a fine point, 1-4 in. by 1½-3 lin., thin, green or more or less glaucous, glabrous or more or less loosely hairy. Racemes 2-9 (rarely more), sessile or bare at the base with traces of arrested spikelets, subdigitate or racemosely arranged on a very slender angular (at least upwards) smooth common rhachis 11-3 in. long, usually solitary, sometimes 2-3-nate, erect or more or less spreading, straight, flexuous or arching, very slender, 1-3 in. long, rather loose, green, variously tinged with purple, the lowest sometimes compound at the base; rhachis more or less wavy, very slender, $\frac{1}{10} - \frac{1}{8}$ lin. wide, rarely much wider, triquetrous, angles smooth or more rarely scaberulous, internodes 1-1½ lin. long or here and there much longer and then the spikelets very unevenly distributed; pedicels 2-nate, finely filiform, flexuous, angular to subangular, scaberulous or almost smooth, unequal, the longer up to 1 lin. long. Spikelets loosely appressed, elliptic-oblong, acute or subobtuse, 1 lin. long, glabrous. glume membranous, ovate, acute or obtuse, up to $1\frac{1}{4}$ lin. long; upper elliptic-oblong, acute or subobtuse, as long as the spikelet or slightly shorter, usually 5- rarely 3- or 7-nerved with the submarginal nerves faint. Lower floret: valve very similar in shape and size to the upper glume if not slightly longer, 7-nerved, nerves more or less prominent, equidistant; valvule exceeding the lodicules by their





own length or shorter. Upper floret as long as the lower, chartaceous, elliptic-oblong to elliptic, shortly acute to apiculate, 3-nerved, pale to pale olive-green, at maturity shining brown, margins of valve white. Anthers ½ lin. long. Grain whitish, ellipsoid, up to ¾ lin. by ¾ lin., scutellum half the length of the grain.—Chiov. in Result. Scient. Miss. Stefanini-Paoli, 225. D. vestita, Fig. & De Not. in Mem. Acc. Tor. ii. xiv. 356, t. 22. D. scalarum, Chiov.l.c. Panicum abyssinicum, Hochst. in Flora, 1841, i. Intell. 19; A. Rich. Tent. Fl. Abyss. ii. 360; Durand & Schinz, Consp. Fl. Afr. v. 740; K. Schum. in Engl. Pfl. Ost-Afr. C. 100; Chiov. in Ann. Istit. Bot. Roma, viii. 294. P. muticum, Hochst. ex A. Rich. l.c. 362; Oliv. in Trans. Linn. Soc. xxix. 171; not of Forsk. P. scalarum, Schweinf. in Bull. Herb. Boiss. ii. App. ii. 20; Durand & Schinz, l.c. 764; K. Schum. l.c. C. 101; Engl. in Sitzungb. Preuss. Akad. Berlin, 1904, x. 397. P. kafuroënse, K. Schum. in Engl. Jahrb. xxiv. 334.

Nile Land. Eritrea: Amasen; near Saganaiti, 7200 ft., Schweinfurth & Riva, 1387! Dongollo; near Ghinda, Pappi, 4213! Abyssinia: Tigre; a weed in fields near Adowa, Schimper, 95! in scrub at the foot on Mount Scholoda, Schimper, 82! Adeli Dschoa, Schimper, 519! Shire Plateau, Schimper, 1827! Samen; near Debri Eski, 10,000 ft., Schimper, 32! Jaja, 6000 ft., Schimper, 384! Jowo Soria, 6200 ft., Schimper, 994! Ankober, Roth! and without precise locality, Schimper, 910! 944! Sudan: Sennar, near Fazokl, Figuri. Uganda: in a banana grove on Ruwenzori, 5300 ft., Scott Elliot, 7611! dry bare places, Scott Elliot, 7233! common in marshes, Scott Elliot, 7404! in coffee plantations at Kampala, Dummer! British East Africa: Kikuyu, and road to Eldama Ravine, 4000–6000 ft., Whyte! Naivasha to Baringo Valley, Gregory! Nairobi, Linton, 5! 131! Dowson, 224! Dummer, 1576! 1956! Nakuru, 6000 ft., Scott Elliot, 6814!

Mozambique Distr. German East Africa: common in Karagwe, Grant!

Kafuro, Stuhlmann, 1709!

Also in Tropical Arabia.

According to Dummer the worst weed in Coffee plantations. On some spikelets a few short hairs were observed. They were straight with gradually

tapering sharply pointed tips.

Panicum abyssinicum was based on specimens collected by Schimper in shady scrub at the foot of Mount Scholoda near Adoa, Abyssinia (no. 82). I cannot distinguish it from "Panicum muticum, Hochst. ex A. Rich." for which Schweinfurth proposed the name P. scalarum, owing to the earlier homonym P. muticum, Forsk., a totally different plant. Schimper, 95, in Herb. Benth. consists of 3 pieces, 2 exactly like Schimper, 95, in Hb. Hooker, and one exactly like Schimper, 82. The latter has long prostrate many-noded culm-bases, more flaccid and hairy leaves and wider rhachises with distinct scaberulous or scabrid green margins or narrow wings. A part of Roth's specimens shows the same peculiarities. These specimens appear to me to be mere shade forms. The number of nerves of the upper glume is in so far variable that the outermost of the usual 5 nerves become sometimes very faint or short or disappear altogether, while in other cases a sixth and seventh faint nerve may be added close within the margin.

Chiovenda, I.c., described a var. velutinum, chiefly characterized by spreadingly- and long-villous leaf-sheaths and blades. This seems to be merely an accentuated state of the type of hairiness found in Schimper, no. 82, and in a part of Roth's specimens. He indicates this form from the following regions —Amasen, Pappi, 3664, Michelettii, 138; Assaorta, 8850 ft., Pappi, 2817; Scimezana, 8200 ft., Pappi, 803; Ocule Cusai, 8200–9850 ft., Pappi, 1274,

1591, 1659, 1955; Sarae, 5570 ft., Pappi, 340.

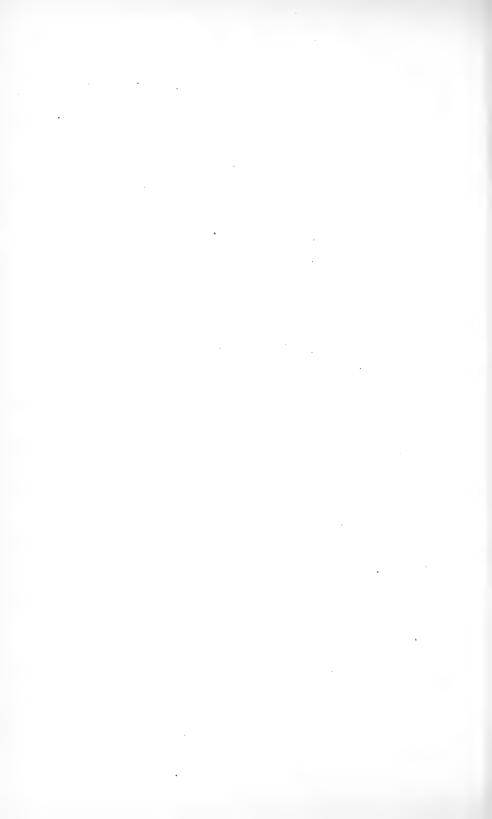
30. D. leptorrhachis, Stapf. Annual, up to 2 ft. high. Culms (base not known) erect, slender, smooth, collapsing and sulcate when dry, simple at least upwards, uppermost internode long-exserted. Leaf-sheaths somewhat loose, thin, striate, sparingly hirsute and ciliate or quite glabrous except at the finely hispidly bearded nodes; ligules membranous, truncate or rounded, crenulate, 1 lin. long; blades linear, long-tapering to a fine point, 3-5 in. by 1-2 lin., flat, flaccid, pale green, glabrous or with a few spreading tubercle-based hairs towards the base, or very loosely and finely pubescent, scaberulous upwards along the finely cartilaginous margins and on the upper side towards the tips, otherwise smooth, midrib very slender, primary lateral nerves 2-3 on each side, obscurely raised above. Racemes 8-15, sessile or bare at the base with traces of arrested spikelets, fastigiate on a slender upwards angular common axis (up to over 2 in. long, but usually much shorter), solitary or pseudoverticillate, often bare at the base for a short distance (up to \frac{1}{3} in.), very slender, mostly obliquely spreading, straight or slightly arching, about 3 in. long; rhachis filiform, triquetrous, ½ lin. wide, angles very finely marginate, scabrid, internodes about 1 to over 1½ lin. long; pedicels 2-nate, finely filiform, very unequal, the longer up to 1 lin. long, angular, scaberulous. Spikelets loosely appressed and loosely disposed, oblong, acute, 1 lin. by $\frac{1}{3}$ lin., whitish with fine silvery silky lines. Lower glume a minute delicate membrane, early breaking up; upper oblong, as long as the spikelet, with a small obtuse hyaline tip, inrolled when dry and then apparently acute, very thin, very distinctly 5-nerved with 4 fine lines of hairs (the space inside the submarginal nerve glabrous), hairs very delicate with recurved or circinate tips, up to $\frac{1}{5}$ lin. long. Lower floret: valve very thin, corresponding in shape and size to the spikelet, finely 7-nerved, nerves equidistant with a dense fringe of hairs along the margin and a fine but dense line between the 2 inner lateral nerves (of each half), hairs as in the upper glume; valvule and lodicules microscopic. Upper floret lanceolate-oblong, acutely acuminate, as long as the spikelet, very pale, thinly chartaceous, margins of valve meeting or overlapping upwards (when young). Anthers ½ lin. long.

Upper Guinea. French Sudan : on dry land near Segu, $L\acute{e}card$, 252!

Good fodder according to Lécard. Very near to *D. nigritiana* and to *D. polybotrya*, differing from both in the slightly larger whitish spikelets with fine silvery lines formed by more copious and rather longer hairs, from the former also in its bearded nodes. The racemes also seem to be less numerous than in either of them.

31. D. polybotrya, Stapf. Annual, up to 3 ft. high. Culms erect or subgeniculate, somewhat slender, 3-noded, smooth, collapsing and deeply sulcate when dry, simple or sparingly branched, uppermost internode long-exserted, the others soon bared by the sheaths slipping off. Leaf-sheaths rather loose, thin, finely striate, subherbaceous,





finely hirsute or all or at least the uppermost glabrous except at the dark broad (2 lin.) hispidly bearded nodes; ligules membranous, truncate, crenulate, up to 2 lin. long; blades linear, long-tapering to a fine point, 3-4 in. by $1\frac{1}{2}$ -2 lin., flat, flaccid, green, glabrous or sparingly hairy, margins cartilaginous, scaberulous towards the tips, otherwise smooth, midrib very slender, pale, primary lateral nerves up to 6 on each side, slightly raised above. Racemes very numerous, usually over 20, sessile, fastigiate on a slender angular common axis up to 3 in. long, overtopping it by 2-3 in., mostly solitary and bearing spikelets from the base or from near it, very slender, mostly subcrect, rarely spreading, up to 4 rarely 5 in. long, flexuous, loose, pale green or tinged with purple; rhachis filiform, triquetrous, $\frac{1}{10} - \frac{1}{7}$ lin. wide, with scattered very fine long spreading hairs in the lower part, internodes about 1 lin. long, angles very finely marginate, scaberulous; pedicels 2-nate, finely filiform, very unequal, the longer \(\frac{2}{3}\) lin. long, angular, minutely scaberulous. Spikelets loosely appressed, hardly imbricate even when young, oblong to oblong-lanceolate, acute, about $\frac{2}{3}$ lin. by $\frac{1}{4}$ lin., apparently glabrous. Lower glume a minute hyaline scale or 0; upper oblong, acute, as long as the spikelet, very thin, finely 5-nerved, with 4 very fine lines of hairs (the space inside the submarginal nerve glabrous), hairs very delicate with recurved or circinate tips, $\frac{1}{10}$ lin. long. Lower floret: valve very thin, corresponding in shape and size to the spikelet, prominently but finely 7-nerved, nerves equidistant, with a delicate appressed fringe of hairs along the margins and a fine often imperfect line between the 2 inner lateral nerves (of each half) or there sometimes quite glabrous; valvule and lodicules microscopic. Upper floret lanceolate-oblong, acutely acuminate, as long as the spikelet, pale olive- or greyish-green, thinly chartaceous, margins of valve at length distant. Anthers $\frac{1}{2}$ lin. long. Grain ellipsoid, white, $\frac{1}{2}$ lin. long.—Panicum nigritianum, var., Hack. in Oest. Bot. Zeitschr. 1901, 293.

Lower Guinea. Belgian Congo: Stanley Pool District; Mokaba, Vanderyst, 3890! Muschie, Vanderyst, 3919! islands in Stanley Pool, Buettner. Kwango District; sandbanks in the Kwilu River, Vanderyst, 2617 partly! between Lutschima and Katschaka, Vanderyst, 3807 partly!

Very near to *D. nigritiana*, Stapf, but differing in the broad bearded nodes, hairy sheaths and short blades. The spikelets are practically indistinguishable. There is a much battered specimen in the Kew collection communicated by Sir W. MacGregor from Lagos (no. 157 partly) which has the bearded nodes of *D. polybotrya* with which it agrees in the structure of the spikelets, but from which it differs in their whitish colour, fewer racemes, greater number of nodes, and more hairy leaves.

32. D. nigritiana, Stupf. Annual, over $2\frac{1}{2}$ ft. high. Culms slender, terete, glabrous, very smooth, few-noded, simple or branched from the lower nodes (Hackel). Leaf-sheaths terete, glabrous, smooth, closely striate, nodes quite glabrous; ligules oblong-obtuse, scarious,

over 1 lin. long; blades narrowly linear, tapering to a fine point, 6 to 8 in. by $1-\frac{1}{2}$ lin., slightly rigid, flat, glabrous, smooth or the margins scaberulous upwards; 'midrib very slender, lateral nerves, numerous, very fine and close, the primary hardly distinct. Racemes 6-15, sessile, subdigitate or racemosely arranged on a slender angular common rhachis (up to 2 in. long), very slender, erect or suberect, 3-6 in. long, somewhat loose; rhachis filiform, $\frac{1}{7}$ lin. wide, triquetrous, almost straight, angles very finely marginate, internodes 1½-2 lin. long; pedicels 2-nate, finely filiform, angular, scaberulous, very unequal, the longer up to over 1 lin. long. lets loosely subappressed, not or only slightly imbricate, lanceolateoblong, acute, $\frac{4}{5}$ $\frac{9}{10}$ lin. by $\frac{2}{5}$ lin., pale green or brownish, apparently glabrous. A Lower glume a very minute delicately hyaline scale, soon disappearing; upper oblong-lanceolate, equalling the spikelet, finely 5-nerved, with 4 very fine lines of appressed hairs (2 in the innermost spaces on both sides of the middle-nerve and 2 marginal), hairs extremely fine, straight or the obtuse tips curled, $\frac{1}{7} - \frac{1}{6}$ lin. long. Lower floret: valve in shape and size corresponding to the spikelet, very thin, 7-nerved, nerves fine but prominent, with very fine lines of appressed hairs between the 2 inner lateral nerves of each half and along the margins, hairs as in the upper glume; valvule and lodicules very minute. Upper floret lanceolate, acute, as long as the spikelet, pale to slate-colour, thinly chartaceous, margins of valve not meeting. Anthers \(\frac{2}{5}\) lin. long.—Panicum nigritianum, Hack. in Oest, Bot, Zeitschr. 1901, 293; Durand & Schinz, Consp. Fl. Afr. v. 756.

Upper Guinea. Southern Nigeria: Brass River, Barter!

Hackel quotes a variety or form (unnamed) from Stanley Pool collected by Büttner. I have not seen it. It is said to have bearded nodes and hairy leaves. There is little doubt that it corresponds to *D. polybotrya*, described above.

33. D. debilis, Willd, Enum. Hort. Berol. 91. Annual. ascending from a geniculate or prostrate and rooting base and branched from it or all along, rarely more or less subsimple, 1-2 ft. high, primary culms many-, secondary usually 6-noded, moderately slender, glabrous, upper 1 or 2 internodes by far the longest. Leafsheaths somewhat loose, thin, glabrous or the lower more or less softly hairy and slightly keeled; ligules membranous, rounded, 1-11 lin. long; blades linear from an equally broad or more or less contracted and rounded base, long-tapering to a slender point, the lower usually not much over 1 in. by $1-1\frac{1}{2}$ lin., the upper up to 4 in. by 3 lin., but usually smaller, flat, somewhat plump, flaceid, glabrous or softly hairy to almost tomentose, margins often wavy or crisp, rough, midrib slender, lateral nerves very fine. Racemes usually 5-11, sessile, subdigitate on a slender angular scabrid common rhachis $(\frac{1}{2}-1\frac{3}{4})$ in. long), slender, subtreet or obliquely spreading,





3-5 (rarely up to 8) in. long, mostly pale green in flower; rhachis triquetrous, straight or wavy, $\frac{1}{7}$ din. wide, pale, angles finely marginate, scabrid, internodes 1 or, the lower, $1\frac{1}{2}$ to almost 2 lin. long; pedicels 2-nate, very finely filiform, angular, scabrid, the longer about 1 lin. long. Spikelets loosely appressed, not or obscurely imbricate when young, lanceolate, finely to almost caudate-acuminate, 1-1½ lin. long, pale or vellowish-green, sometimes tinged with purple, apparently quite glabrous. Lower glume a minute hyaline whitish cuff-like scale, separated from the upper by a distinct internode, hence the spikelet shortly "stipitate" within the lower glume; upper glume very thin, lanceolate, acutely acuminate to almost caudate, as long as the spikelet, 5-nerved, with a fine line of appressed hairs, curled at the tips and about $\frac{1}{10}$ lin. long in each of the spaces between the middle nerve and the adjacent side-nerves and another along the margins, rarely sub-7-nerved with a faint additional nerve inside the inner line of hairs. Lower floret: valve very similar in texture and pubescence to the upper glume, but shorter by onequarter to one-third, narrowly oblong, shortly acuminate, 7-nerved, with lines of hairs between the inner pair of side-nerves and along the margins, often irregular or suppressed on one side; valvule and lodicules microscopic. Upper floret almost equalling the lower, lanceolate, acutely acuminate, pale or dull purplish, thinly chartaceous, margins of valve slightly overlapping upwards when mature. Anthers almost \(\frac{1}{4}\) lin. long. Grain narrowly oblong, plano-convex, whitish $\frac{1}{2}$ lin. long; scutellum elliptic, less than half the length of the grain.—Coss. & Durieu, Expl. Scient. Alger. ii. 33; Stapf in Dyer, Fl. Cap. vii. 377; Rendle in Cat. Afr. Pl. Welw. ii. 163; Cheval. Sudania, 22. D. variabilis, Fig. & De Notaris in Mem. Acc. Torin. sér. ii. xiv. (1853), 357, t. 23. D. decipiens, Fig. & De Notaris, I.e. 359, t. 24. Panicum debile, Desf. Fl. Atlant. i. 59; Trin. Panic. Gen. 117; Steud. Syn. Pl. Glum. i. 41; Battand. & Trab. Fl. Alger. (Monoc.) 131; Durand & Schinz, Consp. Fl. Afr. v. 746. P. filiforme, Poir. Voy. en Barb. ii. 93; not of Linn. P. reimarioides, Anderss. in Peters, Reise Mossamb. Bot. 547. Paspalum debile, Poir Encycl. v. 34 (excl. syn.); Fluegge, Gram. Monogr. 136; Kunth, Enum. i. 45.

Upper Guinea. French Sudan: San, borders of the Bani River, Chevalier, 1095! Southern Nigeria: Lagos, Foster, 7a! Northern Nigeria: Katagum District, Dalziel, 254! Abinsi, Dalziel, 879! Sokoto: in meadows, Dalziel, 496!

Nile Land. Cordofan and Fazokl, according to Figari and De Notaris, l.c. Lower Guinea. Angola: Pungo Andongo, Welwitsch, 2854! Calunda, Welwitsch, 2710! Benguella; Fort Princeza Amelia, Cubango River, Gossweiler, 1981! in wet places between Humpata and Huilla, 5500 ft., Pearson, 2607!

Mozambique Distr. Portuguese East Africa: sandy moist places on the Lower Zambesi, Peters. Nyasaland: in marshy ground near the Umbaka

River, Scott!

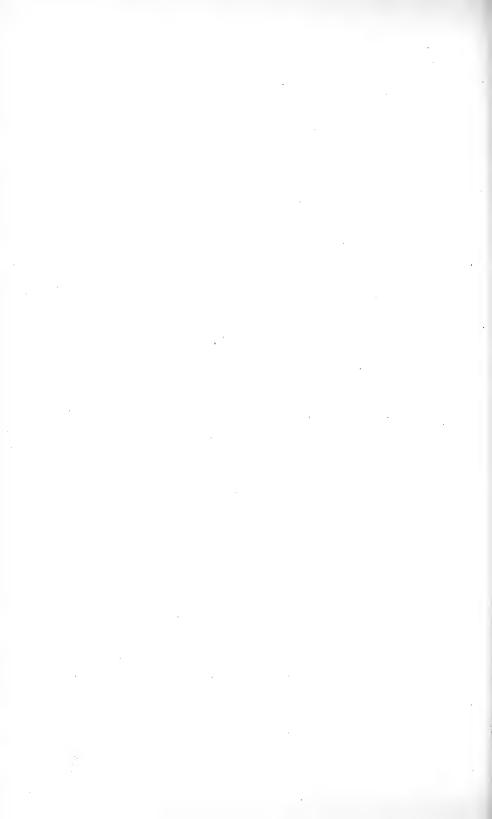
Also in Natal (in native gardens) and Madagascar (?) and in the Mediterranean countries from Algeria and South Italy to Portugal. Not in India. Paspalum sanguinale, var. debile, Hook. f. Fl. Brit. Ind. vii. 16, which by its

author was supposed to be this species, is certainly distinct and apparently $D.\ pruriens$, Büse. Welwitsch, 2710, represents a very robust state with unusually long spikelets (up to over 2 lin.). It was described as var. gigantea by Rendle in Cat. Afr. Pl. Welw. ii. 163. The spikelets correspond very nearly to those figured for $D.\ decipiens$ by Figari and De Notaris. These authors also describe and figure a $D.\ variabilis$, 1.c. 357, t. 23, of which they say that it approaches very closely to $D.\ decipiens$, but has relatively broader and shorter spikelets, with the upper glume pubescent only along the margins, and has less acute angles to the rhachis. They describe it as "perennans." I consider it to be typical $D.\ debilis$.

Used as horse fodder in North Nigeria and known there as "Harikia" (Dalziel).

34. D. maniculata, Stapf. Annual, long (2 ft.) trailing on the ground, rooting at and throwing up flowering culms $(1-1\frac{1}{2})$ ft. high) from the very numerous nodes. Culms very slender, terete, glabrous, internodes of the trailing portion to over 25, about 1 lin. long, exserted or bared by the slipping off of the sheaths, of the ascending flowering branches 12 or more, the lower 8-10 about $\frac{1}{3}$ in. long, as long as the sheaths and tightly clasped by them, the uppermost long-exserted, 3-4 in. long, the longer of the flowering branches or culms rooting at and branched again from the lower internodes and sometimes with arrested leafy branches higher up. Leaf-sheaths terete, firm, particularly those of the flowering culms, glabrous and smooth or here and there with a few spreading hairs, very finely and closely striate; ligules membranous, very short, truncate; blades lanceolate, tapering almost from the base to an acute point, $\frac{3}{4}$ - $1\frac{1}{4}$ in. by $1\frac{1}{2}$ lin., rigid, almost pungent, glabrous and smooth (also along the margins) or with a few long tubercle-based cilia towards the base, glaucous, sometimes with a tinge of purple. Racemes 2-nate, sessile, the lower with a short, the upper with a longer $(\frac{1}{3} - \frac{1}{2} in.)$ filiform bare base, erect or oblique, straight, very slender, $1-2\frac{1}{2}$ in. long, whitish-green; rhachis very slender, slightly wavy or almost straight, flat, $\frac{1}{7} - \frac{1}{5}$ lin. wide, quite smooth, margins at first incurved, at length more or less recurved between the nodes, these about $1\frac{1}{2}$ -2 lin. apart; pedicels 2-nate, one very short or almost completely suppressed, the other filiform, or more or less compressed, semilunar in cross-section, with a minute discoid tip, about 1 lin. long, smooth. Spikelets tightly appressed, not imbricate, lanceolateoblong, shortly acuminate, about 1 lin. by $\frac{1}{3}$ lin., pale green, whitesilky, often blue or lilac at the base. Lower glume a broad rounded or truncate hvaline white, lilac or bright blue scale \frac{1}{4} lin, long, tightly appressed to the spikelet and clasping it with the narrowly inflexed margins or quite flat; upper glume narrowly oblong, acuminate, as long as the spikelet, delicate, 5-nerved, with dense lines of hairs between the nerves and along the margins, hairs much longer towards the tips and exceeding them, very fine, minutely papillose, the upper usually doubled back on themselves, gathered in a point like that of a painter's brush. Lower floret: valve oblong, acutely acuminate,





as long as the spikelet, thin, pale, 7-nerved, with lines of hairs between the inner side-nerves (of each half) and along the margins and also with a dense large tuft of hairs on each side at the base, these tufts protruding as a dense snow-white fluffy fringe from underneath the cuff-like lower glume, hairs as in the upper glume but rather finer and the knob-like papillæ very marked, those of the tufts doubled up, over \(\frac{3}{4}\) lin. long (expanded), the others short; valvule and lodicules microscopic. Upper floret oblong-lanceolate, acutely acuminate, almost as long as the spikelet, pale, thinly chartaceous, the hyaline margins of the valve meeting or overlapping to below the middle. Anthers \(\frac{1}{2}\) lin. long.

Lower Guinea. Belgian Congo: Stanley Pool District; on sandbanks near Chenul, Vanderyst, 5177! 5179!

When the cuff-like lower glume is blue or lilac the contrast between it and the snow-white fringe of hairs protruding from underneath is very pleasing and striking. The diameter of the hairs is, excluding the papillæ, 3–5 μ at the base and 2–3 μ near the tips, and including the papillæ 4–6 and 3–4 μ respectively. The doubling back of the hairs is very singular. Possibly they spread out on maturing, when they would make a perfect parachute.

35. D. angolensis, Rendle in Cat. Afr. Pl. Welw. ii. 165. Annual, up to 2 ft. high. Culms elect or ascending from a slender geniculate base, many-noded, sparingly branched below, glabrous. Leafsheaths loose, thin, slightly keeled upwards, slipping off the culm, glabrous or hairy on the keel; ligules brown, scarious, roundedovate, up to over 1 lin. long, glabrous; blades linear, slightly narrowed downwards, tapering to an acute point, 5-7 in. by up to 4 lin. wide, flat, glabrous, smooth except along the rough cartilaginous and often crisped margins, midrib slender, but distinct and prominent below, primary lateral nerves about 4-5 on each side, very slender and rather distant. Racemes about 8, digitate on a short common axis, slender, suboblique, somewhat loose, 5 in. long; rhachis very slender, triquetrous, up to \(\frac{1}{4}\) lin. wide, angles scabrid; pedicels 2-4-nate, very finely filiform, subterete or somewhat compressed and slightly angular, almost smooth, the longest up to 2 lin. long and flexuous. Spikelets oblong, acute to subacute, slightly over 1 lin. long, pale, whitish-silky. Lower glume a minute very delicate hyaline truncate scale; upper oblong, acute, as long as but slightly narrower than the spikelet, very thin, very finely 5-nerved with the lateral nerves very close, delicately hairy all over, hairs very fine, wrinkled or minutely verrucose. Lower floret corresponding in outline and length to the spikelet: valve thin, sub-7-nerved, densely silky from between the inner side-nerves and the margins, hairs as in the upper glume, about $\frac{2}{5}$ lin. long; valvule and lodicules minute. Upper floret oblong, acute, as long as the spikelet, pale, thinly chartaceous, margins of valve meeting.—Panicum angolense, K. Schum. in Just, Jahresb. 1899, i. 457.

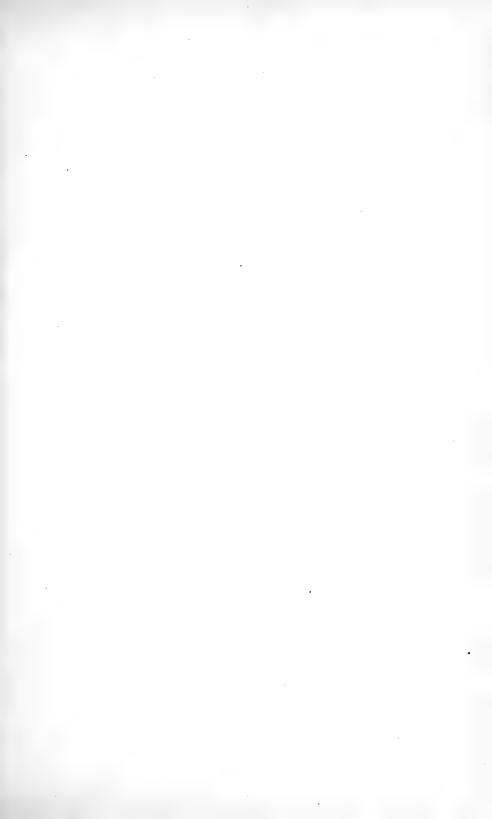
Lower Guinea. Angola: Pungo Andongo; in damp meadows near Sansamanda, Welwitsch, 2790!

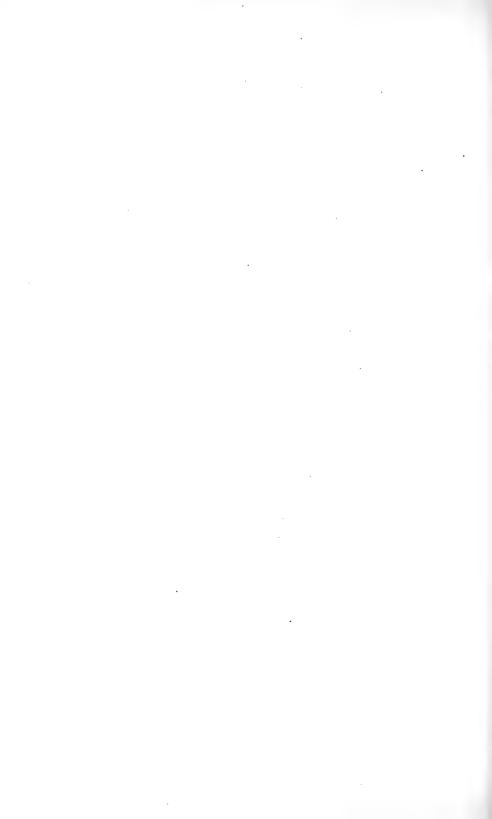
36. D. argyrotricha, Chiov. in Result. Scient. Miss. Stefanini-Paoli, i. 183. Annual. Culms tufted, erect from a slightly geniculate base, sparingly branched below, glabrous, slender, 4-5-noded, the first internodes very short and sheathed all along, the uppermost long-exserted. Leaf-sheaths rather tight or somewhat loose, glabrous or the lower more usually ciliate along the margins and on the keel-nerve, rarely loosely hairy all over; ligules short, truncate, denticulate; blades lanceolate to linear, acutely acuminate, 1-4 in. by 2-4 (rarely 1) lin., obliquely spreading, flat, soft, glaucous, glabrous, rarely sparingly and very finely hairy, midrib and primary lateral nerves very fine, margins cartilaginous, scaberulous, often crisp. Racemes 2 or 3, sessile, digitate, slender, 3 to over 6 in. long, erect or oblique, white-silky on the face, green on the back; rhachis flat, straight, $\frac{1}{3} - \frac{1}{2}$ lin. wide, green, margins scabrid, midrib whitish, convex, smooth and about equally wide on both sides; pedicels 2- or 3-nate or solitary upwards, flexuous, terete with discoid tips, whitish, smooth, the longest up to 1 lin. long, adnate downwards. Spikelets appressed, subimbricate, oblong-lanceolate, acuminate, from not quite $\frac{3}{4}$ to over 1 lin. long (excluding the terminal tuft of hairs), long and densely white-silky. Lower glume a delicate cufflike membrane, $\frac{1}{10} - \frac{1}{8}$ lin. long, soon breaking up and disappearing; upper delicate, lanceolate, acute, as long as the spikelet, sub-5-nerved, densely covered with fine shaggy or appressed silky hairs up to $\frac{1}{2}$ lin. long, thin-walled or somewhat thick-walled and mostly wrinkled upwards. Lower floret: valve hyaline, oblong-lanceolate, acute, as long as the spikelet, 5-nerved, nerves fine, equidistant, usually obscure owing to the copious shaggy indumentum which consists of long hairs (like those of the upper glume up to over $\frac{1}{2}$ lin. long) and is produced beyond the tips into a thick silky pointed brush up to $\frac{1}{4}$ lin. long, usually snow-white; valvule and lodicules microscopic. Upper floret lanceolate, acutely acuminate, $\frac{3}{4}$ lin. by $\frac{1}{3}$ lin., slightly shorter than the spikelet (apart from the apical tuft of hairs), pale brown, thinly chartaceous, margins almost contiguous at maturity except at the base. Grain elliptic, dorsally more or less compressed, \frac{1}{2} lin. by over $\frac{1}{4}$ lin., white; scutellum broad-elliptic, obscurely marked off, about $\frac{1}{3}$ the length of the grain.—Panicum argyrotrichum, Anderss. in Peters, Reise Mozamb. ii. 548; Hack. in Bulet. Soc. Brot. vi. 141; Durand & Schinz, Consp. Fl. Afr. v. 741; K. Schum, in Engl. Pfl. Ost-Afr. C. 100.

Nile Land. British East Africa: Tanaland, Linton, 197! Italian Somaliland: common on dunes near Torda (lower Jub), Paoli, 319.

Mozambique Distr. Zanzibar, Hildebrandt, 1089! Last! German East Africa: Tanga, Holst, 2033! Portuguese East Africa: Querimba, Peters Mozambique; British Frontier, Carvalho! Msalu River, Allen, 137!

Evidently closely allied to *D. longiflora*, but distinct in its bushy growth, broader leaves and the long copious silky indumentum of the spikelets. The mature fertile floret also seems to be slightly more slender and brown, not olive-green.





Pota 37. D. longiflora, Pers. Syn. i. 85. Annual. Culms usually rising in fascicles from a long prostrate rooting base and its numerous nodes, often geniculate and branched below, glabrous, rarely shortly plumose towards the inflorescence, slender to very slender, the ultimate lateral flowering branches 4-5-noded, the first internodes very short and sheathed more or less all along, the uppermost longexserted. Leaf-sheaths rather tight except when enclosing a branch, glabrous or more rarely the lower more or less hairy and sparingly bearded at the nodes; ligules very short, membranous; blades lanceolate to linear, acute, $\frac{1}{2}$ -4 in. by 1-2 lin., often spreading, flat, soft, glabrous or with a few fine sometimes tubercle-based hairs here and there, rarely hairy all over, nervation very faint. Racemes usually 2 or 3, rarely more, sessile, digitate, very slender, 1-3 in. long, erect or spreading, pale green in flower; rhachis flat, straight, $\frac{1}{3}$ lin. wide, pale green, margins scabrid, midrib whitish, convex and smooth on both sides, wider on the back than on the face; pedicels 2-3nate, flexuous, terete with discoid tips, whitish, smooth, the longest up to 1 lin. long, adnate downwards. Spikelets appressed, subimbricate, elliptic-oblong, acute or subacute, $\frac{2}{3} - \frac{3}{4}$ lin. long, pale green or whitish owing to the delicate appressed pubescence. Lower glume 0 or represented by the most rudimentary traces of a delicate membrane; upper delicate, broad-oblong, subobtuse or subacute, as long as or almost as long as the spikelet, 5-3-nerved with dense lines of appressed very fine upwards wrinkled thin-walled hairs $\frac{1}{7}$ lin. long between the nerves and along the margin. floret: valve hyaline, of the shape and size of the spikelet, 7-nerved, nerves very fine, equidistant, usually obscure owing to the appressed pubescence which consists of lines of hairs like those of the upper glume, occupying the margin and the spaces between the nerves except the innermost; valvule and lodicules microscopic. floret equalling the spikelet, shortly acute or subapiculate, slatecolour to olive-green when ripe, thinly chartaceous, margins of valve slightly overlapping to low down. Anthers $\frac{1}{4}$ lin. long. Grain ellipsoid, slightly compressed, $\frac{2}{5}$ lin. by $\frac{1}{4}$ lin., white; scutellum broad-elliptic, obscurely marked off, less than half the length of the grain.—Rendle in Cat. Afr. Pl. Welw. ii. 162. D. Pseudo-Durva, Schlechtend. in Linnæa, xxvi. 458. D. linearis, Schult. f. Mant. ii. 264; not of Roem. & Schult. D. tenuistora, Stapf in Dyer, Fl. Cap. vii. 380; not of P. Beauv. Paspalum longiflorum, Retz. Obs. iv. 15; Baker, Fl. Maurit. 431; Durand & Schinz, Consp. Fl. Afr. v. 737; Études Fl. Congo, 320; Durand & De Wild. Mat. Fl. Congo. i. 44; Th. & Hél. Durand, Syll. Fl. Congol. 629; Hook. f. Fl. Brit. Ind. vii. 17 (partly). P. brevifolium, Fluegge, Gram. Monogr. 150; Kunth, Enum. i. 48. P. parvulum, Trin. Pan. Gen. 117, and in Mém. Acad. Pétersb. 6me sér. iii. (1835) 305; Steud. Syn. Pl. Glum. i. 41. P. Pseudo-Durva, Nees, Fl. Afr. Austr. 21; Steud, l.c. 41. Panicum argyrotrichum, Durand & Schinz, Consp. Fl. Afr. v. 741, and Études

Fl. Congo, 321; De Wild. & Durand, Contr. Fl. Congo, i. fasc. ii, 72: not of Anderss.

Upper Guinea. Sierra Leone: Jala, Bunting, 91! Mount Barclay, Bunting! and without precise locality, Welwitsch, 2946! French Guinea: on cultivated ground near Timbo, Pobéguin, 1702 bis! 1706! 1828! Segou, Lécard, 252 partly! Southern Nigeria: Lagos, MacGregor, 39! Opobo, Jeffreys, 5! 26!

Lower Guinea. Gaboon: in savanahs at Munda, Soyaux, 430! French Congo: Brazzaville, Thollon, 372! Portuguese Congo: Cabinda, Gossweiler, 6435! Belgian Congo: Cataract District; Thysville, Vanderyst, 4417! Lukungu, 700–800 ft., Hens, 273! Lutete, 1800–2000 ft., Hens, 209! Stanley Pool District; Kisantu, Gillet, 1902! Kunzulu, Vanderyst, 5184! Angola: Pungo Andongo (?), Welwitsch, 7256! Pungo Andongo; Pedras de Guinga, Welwitsch, 2935! Cazengo, Gossweiler, 5738!

Nile Land. Somaliland: Golis Range, Drake-Brockman, 150! Uganda:

grassland near Namanzmyi, 4000 ft., Dummer, 2557!

Mozambique Distr. German East Africa: Usambara; Muoa, in old cultivated land, Holst, 3123! Kilimanjaro; Marangu, Volkens, 1469!

Also in South Africa, Madagascar, the Mascarenes and through India into Malaya.

Digitaria tenuiflora, P. Beauv. (Panicum tenuiflorum, R. Br. Prodr. 193) is apparently a perennial grass and has a stiff erect habit and long narrow leaves.

Gossweiler's specimens quoted above are distinguished by the presence of numerous fine spreading hairs on the internode below the inflorescence.

38. D. exilis, Stapf in Kew Bulletin, 1915, 385. Annual. Culms erect or geniculate-ascending, over $1\frac{1}{2}$ ft. high, simple or sparingly branched from below, 5-8-noded, internodes mostly shortly exserted except the uppermost which is long-exserted. Leaf-sheaths tight or the lower and intermediate somewhat loose and slipping off the internodes, glabrous, smooth, striate, the lower more or less keeled; ligules membranous, rounded, broad, up to 1 lin. long; blades linear, gradually tapering to an acute point, 2-6 in. by $1\frac{1}{2}$ - $3\frac{1}{2}$ lin., flat, glabrous, midrib slender, primary lateral nerves 3-4 on each side. Racemes 2-4, sessile, digitate, suberect or erect, very slender, 2-5 in. long, pale green in flower; rhachis flat, straight, \(\frac{1}{4}\) to almost ½ lin. wide, green, margins scabrid, midrib rather stout, whitish, very slightly convex and smooth on the back, more or less rounded and almost smooth or very sparingly and minutely pubescent on the face; pedicels paired or (upwards always) solitary or towards the base in groups of 3 or 4, flexuous, terete with discoid tips, up to 1 lin. long, whitish, smooth or sometimes very sparingly or minutely asperulous or pubescent. Spikelets subimbricate in flower, ellipticoblong, acute, $\frac{7}{8}$ -1 lin. long, pale green, quite glabrous. Lower glume delicately hyaline, very minute or almost 0; upper broadoblong, obtuse or subobtuse, hyaline between the 3-5 percurrent green nerves, slightly shorter than the spikelet. Lower floret: valve elliptic, subobtuse, as long as the spikelet, thin, hyaline, nerves 7, raised, percurrent, parallel and equidistant or the 3 inner and the 2 outer more approximate, usually anastomosing below the tips; valvule almost microscopic, square. Upper floret thinly chartaceous,





equalling the spikelet, acute, faintly 3-nerved, margins of valve contiguous or almost overlapping in flower, distant in fruit. Anthers up to $\frac{1}{4}$ lin. long, linear. Grain oblong- to globose-ellipsoid, $\frac{2}{5}-\frac{1}{2}$ lin. long, white or slightly purplish, tightly enclosed in the slightly indurated brown husks; scutellum ovate-elliptic, not quite reaching the middle of the grain.—Stapf in Hook. Ic. Pl. t. 3068; Cheval. Sudania, 33. Paspalum exile, Kippist in Proc. Linn. Soc. i. 157, 167. Paspalum longiforum, Cheval. Miss. au Senegal, 241; Pobéguin, Ess. Fl. Guin. Franç. 215; not of Retz.

Upper Guinea. Sierra Leone: Sendugu, Thomas, 572! 654! Mayoso, Thomas, 1485! and without precise locality, Afzelius! Clarke! Schön! French Guinea: Timbo, Pobéguin, 1702! Kouroussa, Pobéguin, 490! San, Chevalier, 2216! 2217! Togo: Difalu, Kersting, 193! Northern Nigeria: Nassarawa, Elliot, 105! Zaria, Lamb, 53! and without precise locality, Yates, 29!

Locally much cultivated from Senegal and Sierra Leone to Nigeria. Vernacular names "Fundi" (Sierra Leone), "Fonio" (Senegal), "Acha" (Hausa States). Very closely allied to D. longifloru, Pers., which may be its ancestral form.

39. D. aristulata, Stapf in Cheval. Sudania, 22, 23. Annual, from a few inches to 1 ft. high. Culms tufted, ascending from a usually prostrate and rooting base and branched from it, primary culms many-, secondary 4-6-noded, slender, glabrous, uppermost internode by far the longest. Leaf-sheaths somewhat loose, the lower of the primary culms usually slipping off the culms, softly hairy and loosely bearded at the bases (nodes); ligules very short, truncate, densely ciliate; blades linear from an equally broad, sometimes slightly rounded base, tapering to an acute point, $\frac{1}{2}$ -1 in. by $1-\frac{1}{2}$ lin., flat, softly and loosely hairy, margins finely cartilaginous and scaberulous upwards, midrib and side-nerves indistinct. Racemes 3-5, sessile, digitate, slender, suberect, rather stiff, $1\frac{1}{4}$ -2 in. long, greenish when in flower; rhachis flat, straight, about \(\frac{2}{5} \) lin. wide, with thin herbaceous sides or wings and a slender midrib, obtuse and prominent particularly on the back, margins scaberulous, internodes 1-1½ lin. long; pedicels 2-3-nate, very finely filiform, flexuous, terete. the longest $\frac{3^{-4}}{5}$ lin. long, slightly scaberulous or glabrous, tips discoid. Spikelets appressed, densely crowded at the base, then subimbricate, oblong-lanceolate, aristulate, narrowly oblonglanceolate, up to 1 lin. long (excluding the awn), apparently quite glabrous. Lower glume suppressed or indicated by a faint hyaline rim; upper oblong, obtuse or subacute, about \(\frac{1}{4} \) lin. long, delicate, 3-nerved, finely hairy along the outer nerves. Lower floret: valve thin, oblong, acute, $\frac{7}{10}$ lin. long, 7-nerved, with a line of hairs along the margins, hairs about $\frac{1}{10}$ lin. long, fine, verrucose all along, at first appressed, spreading at maturity; valvule and lodicules quite obsolete. Upper floret as long as the spikelet, very thinly papery, oblong-lanceolate (ovate if flattened out); valve long-aristulate-acuminate, awnlet smooth, $\frac{3}{4} - \frac{4}{5}$ lin. long, margins slightly

overlapping when mature. Anthers $\frac{1}{5}$ lin. long. Grain oblong, plano-convex, $\frac{1}{2}$ lin. by $\frac{1}{5}$ lin., whitish; scutellum elliptic, not quite half the length of the grain.—Panicum aristulatum, Steud. Syn. Glum. i. 42; Durand & Schinz, Consp. Fl. Afr. v. 741.

Upper Guinea. Senegal, Leprieur! Perrottet, 907! French Sudan: San, on the sandy banks of the Bani River, Chevalier, 1094! Middle Niger; near Djenne, Chevalier, 1121!

Lower Guinea. Lower Congo, Smith!

Hock of 1

40. D. pennata, Chiov. in Result. Scient. Miss. Stefanini-Paoli, i. 183. Suffrutescent, $1\frac{1}{2}$ to almost 3 ft. high, with a short rhizome producing clusters of extravaginal innovations with densely hairy to white-tomentose cataphylls which long surround the bulbously thickened culm-bases. Culms very slender, erect or ascending, many-noded, with barren branches (or their remains) from the lower, and fascicled flowering and barren branches from the upper nodes, wiry or in the older parts quite woody, brown and shining, glabrous; stem-nodes swollen. Leaves glaucous; sheaths tight, firm, finely striate, smooth, finally slipping off and withering away; ligules hyaline, white, truncate, up to I lin. long; blades linear from an equally wide or slightly attenuated base, tapering to an acute point, 2-4 in. by $1\frac{1}{2}$ - $2\frac{1}{2}$ lin., rather firm, though thin, smooth and quite glabrous except for a few occasional long hairs near the junction with the sheath, or very finely pubescent, margins slightly rough, midrib fine, lateral nerves numerous, very fine and close. Racemes 6-10 in a whorl, followed by 1 or few solitary racemes from the continued axis (rarely some of the upper racemes crowded into a second scanty false whorl), spreading at length stiffly and more or less horizontally, up to 5 in. long; rhachis filiform, angular or upwards triquetrous, loosely plumose, bare for 2 or 3 in., then bearing up to 10 (usually 5 or 3) distant paired or upwards solitary spikelets; pedicels of the paired spikelets very unequal, one very short, the other $1\frac{1}{2}$ -2 lin. long, filiform, angular, scabrid. Spikelets linear-oblong, subacute, not quite $1\frac{1}{2}$ lin. by $\frac{2}{5}$ lin., greyish-green to whitish. Lower glume a minute hyaline tightly appressed ovate scale about $\frac{1}{5}$ lin. long; upper linearoblong, subobtuse, equalling the spikelet, membranous, 3-nerved with dense lines of tightly appressed rarely somewhat loose hairs between the nerves and along the margins. Lower floret corresponding in outline and size to the spikelet: valve membranous, 7- or sub-7-nerved, the submarginal nerves very fine or imperfect, the remaining distinct and somewhat raised with very dense lines of extremely fine appressed or slightly loose hairs between the inner 5 and an additional line outside the submarginal, hairs more or less flexuous with obtuse tips, apparently subsolid; valvule and lodicules very minute, up to $\frac{1}{12}$ lin. long. Upper floret linear-oblong, acute, very slightly shorter than the spikelet, turning brown early, chartaceous, tough, margins of valve distant. Anthers \frac{1}{5} lin. long.



= 41 D. Stolzii Mez Ithink D. elegans = ritensalso Hb. -Panicum pennatum, Hochst. in Flora, 1855, 197; Schweinf. Beitr. Fl. Aethiop. 301, and in Bull. Herb. Boiss. ii. App. ii. 18, and in Höhnel, Zum Rudolph-See u. Stephanie-See, 2; Durand & Schinz, Consp. Fl. Afr. v. 759; K. Schum. in Engl. Pfl. Ost-Afr. C. 103; Chiov. in Ann. Istit. Bot. Roma, vii. 62, and viii. 295; Engl., Veget. Somaliland, 23, 34. Paspalum pennatum, Hook. f. Fl. Brit. Ind. vii. 16.

Nile Land. Nubia: Red Sea Province; Kamobsana, 2300 ft., MacDougal, Numa: Red Sea Province; Ramonsana, 2300 ft., MacDougat, 140! Eritrea: Amasen; by the Haddas torrent, Pappi, 2579! 5156! Abyssinia: Samen; on hills near Gurrsarfa, 3000-4000 ft., Schimper, 2233! Goelleb, Schimper, 81! Ennia Palla country, Erlanger; Dolo, Erlanger; and without precise locality, Schimper, 1497! 1581! Arussi and Boran Countries; Fantali, Drake-Brockman, 121! Lake Hardin, Drake-Brockman, 609! Somaliland: by the Dawa River near Ungi, Riva, 1241; in meadows near Wanle Wen (about 45° E. Long., 2° 30′ N. Lat.), Paoli, 1272.

Mozambique Distr. German East Africa: Usambara; on the western slopes of the Para Mountains, Hölmel, 7!

slopes of the Pare Mountains, Höhnel, 7!

Also in Tropical Arabia, Baluchistan and Sind.

41. D. nitens, Rendle in Cat. Afr. Pl. Welw. ii. 165. Perennial, compactly exspitose. Culms erect, simple, up to 2 ft. high, slender, surrounded at the base by a dense mass of yellowish matted wool, pierced by the rigid fibres of decayed sheaths, 2-3-noded, glabrous and very smooth. Leaf-sheaths somewhat loose, glabrous and smooth, rarely the lowest of the culms shortly hairy at the nodes; ligules membranous, short, truncate; blades erect, narrowly linear, tapering to a sharp point, 3-6 in. by 1-1½ lin., flat, rigid, glabrous or very finely hairy, margins scaberulous, midrib and primary side-nerves alike, about 7, somewhat stout and more or less prominent. Racemes peduncled, gathered into an oblong panicle which is 5-7 in. long, loose, flexuous, up to more than 2½ in. long, simple or sometimes compound low down with short secondary branchlets; peduncle up to over 1 in. long, filiform, terete, smooth, purplish; rhachis filiform, about $\frac{1}{8}$ in. wide, trigonous, slightly scaberulous along the finely marginate angles, internodes $1\frac{1}{2}$ lin. long; pedicels 2-nate or upwards solitary, filiform, angular, scabrid and minutely hispidulous towards the tips, with a subdiscoid tip, up to 1½ lin. long. Spikelets oblong-lanceolate, acute to acuminate, $1\frac{3}{4}$ lin. long, pale, slightly silky. Lower glume 0; upper narrowly lanceolate, slightly gibbous at the base, acute, \(\frac{3}{4}\) to over 1 lin. long, very thin, very finely sub-5-nerved (the outer lateral nerves short and very close to the inner), stiffly hairy all over, and so densely near the base that the spikelets there appear shortly bearded. Lower floret corresponding in outline and size to the spikelet: valve very thin, finely 7-nerved, lateral nerves approximate, with dense lines of short $(\frac{1}{4} - \frac{1}{3})$ lin.) stiff acute appressed hairs between the inner side-nerves and along the margins; valvule and lodicules minute. Upper floret lanceolate-oblong, acutely acuminate, very slightly shorter than the barren floret, whitish, very thinly chartaceous. Anthers almost 1 lin. long.—Panicum nitens, K. Schum, in Just, Jahresb. 1899, i. 457.

Lower Guinea. Angola: Huilla; common in sandy clayey thickets near Lopollo, Welwitsch, 2634!

A somewhat aberrant type, in the habit of the panicle resembling the South African Digitaria flaccida, Stapf.

42. D. elegans, Stapf. Perennial, compactly exspitose with woollytomentose bases. Culms erect, slender, simple, about 3-noded, glabrous. Leaves glabrous; lower sheaths tight, firm, long-persistent, upper looser, finely striate, very smooth; ligules reduced to a membranous glabrous rim; blades linear, long-tapering to a fine point, imperceptibly passing into the sheath, of the lower leaves erect and 6-9 in. by 1 lin., of the uppermost very much shorter, flat, glaucous-green, firm, midrib indistinct, merged in the close slender somewhat prominent general nervation. Racemes peduncled, solitary and scattered or opposite or 2-3-nate on a very slender common axis at irregular distances, gathered into a graceful lax oblong or pyramidal panicle (6 in. by 3-3½ in.), very slender, rather loose, obliquely to almost horizontally spreading and slightly curved up to almost 3 in. long; peduncle finely filiform, terete, $1-\frac{1}{4}$ in. long; rhachis compressed, angular, $\frac{1}{10} = \frac{1}{5}$ lin. wide, lateral angles scabrid, internodes about 2 lin. long; pedicels mostly 2-nate, sometimes 3-nate or solitary, unequal, the longer up to $1\frac{1}{2}$ lin. long finely filiform, scabrid and upwards shortly setulose with obscurely discoid tips. Spikelets very loosely appressed, lanceolate, acutely acuminate, $1\frac{1}{2}$ lin. long, green, tinged with purple, purplish-silky. Lower glume 0; upper narrowly lanceolate, subacute, $\frac{7}{10} - \frac{8}{10}$ lin. long, thinly membranous, 3-nerved, with lines of rather stiff appressed (permanently?) purple pointed hairs between the nerves and along the margins about \(\frac{1}{3}\) lin. long. Lower floret corresponding in outline and size to the spikelet: valve firmly membranous, longitudinally slightly and narrowly depressed with the rounded sides somewhat bulging, sub-7-nerved, mid-nerve fine, prominent, smooth, outer pair of lateral nerves very close, almost fused into one (but the vascular strands distinct), a dense line of hairs (like those of the upper glume) on the inner side of the inner side-nerves, starting from the base or higher up, and another along the margins forming an appressed purple fringe which is produced into a short brush-like point beyond the tip of the floret; valvule and lodicules minute. floret lanceolate, acutely acuminate, slightly shorter than the spikelet, thinly chartaceous, pale or often with purple sides, margins of valve contiguous or slightly overlapping in flower.

Lower Guinea. Belgian Congo : Katanga ; in dry wooded land, Elisabethville, $Hombl\acute{e}, 59$!

43. D. uniglumis, Stapf. Perennial, compactly coespitose, with intravaginal innovations and a short promote rhizome. Culms erect, rather firm, coated at the base with the fibrous remains of





the old sheaths, simple, 2-4 ft. high, glabrous or sparingly hairy below the inflorescence, 1-3-noded, the uppermost internode by far the longest. Leaves mostly crowded near the base; lowest sheaths rather firm, strongly striate, appressedly hairy to densely silkytomentose at the base, persistent, at length breaking up into fibres, the following usually glabrous except at the nodes which are either densely bearded or more rarely finely pubescent or very rarely quite glabrous, uppermost very long, rather loose; ligules short or sometimes up to 1½ lin. long, scarious, obtuse or truncate, glabrous; blades linear, tapering to a fine point, up to 9 in. (rarely more) by $1\frac{1}{2}-2\frac{1}{2}$ lin., flat or with involute margins, firm, glabrous, flexuous, green, slightly rough above and on the margins, midrib slender, primary lateral nerves 3-4 on each side, prominent above. Racemes usually very numerous, gathered into an oblong-panicle 5-7 (rarely 9) in. long, simple or the lowest compound, solitary or fascicled on a scabrid or hirsute angular common axis of variable length (mostly exceeding the lower racemes), sessile or the lower bare at the base with traces of arrested spikelets, slender, straight or flexuous, erect or more or less spreading, 2-5 in. long, dense or more or less loose; rhachis very slender, sometimes wavy, triquetrous, $\frac{1}{7}$ lin. wide, lateral angles scabrid or setosely ciliate, internodes up to $1\frac{1}{2}$ lin. long; pedicels in fascicles of 3-6, unequal, the longest up to $1\frac{1}{2}$ lin. long, angular, scabrid and more or less copiously setose upwards, the uppermost setæ usually equalling the spikelets. Spikelets oblong to ovate-oblong, subacute, $\frac{7}{10}\frac{8}{10}$ (rarely $\frac{9}{10}$) lin. long, greyish- or brownish-green on the flat, chestnut- to black-brown on the convex side, quite glabrous. Lower glume suppressed, very rarely represented by a minute hyaline truncate scale; upper a tightly appressed delicate hyaline scale, rotundate-ovate, very obtuse, nerveless or faintly 1-nerved, $\frac{2}{10-10}$ lin. long. Lower floret oblong, as long as the spikelet or slightly shorter, tightly appressed to the face of the upper floret, hyaline, 3-nerved, quite glabrous; valvule a very delicate narrow scale up to $\frac{1}{6}$ lin. long; lodicules very minute. Upper floret corresponding in outline and size to the spikelet, chestnut-brown or at length almost black, somewhat shining, chartaceous, very tough; valve with distant margins. Anthers up to $\frac{1}{2}$ lin. long.—Panicum uniglume, A. Rich. Tent. Fl. Abyss. ii. 370, and in Walp. Ann. iii. 717; Schweinf. Beitr. Fl. Aethiop. 301. P. diagonale, var. uniglume, Hack. in Engl. Hochgebirgsfl. Trop. Afr. 117: Durand & Schinz, Consp. Fl. Afr. v. 747 (partly); Schweinf. in Bull. Herb. Boiss. ii. App. ii. 18; Chiov. in Ann. Istit. Bot. Roma, viii. 294.

Nile Land. Eritrea: Amasen; grassy northern slopes of Mount Bizen, 5900 ft., Schweinfurth, 2017; Mount Koubé, east of Mount Bizen, 6050 ft., Schweinfurth, 1536! Mount Savour, 5900 ft., Pappi, 5402! Matcallat, Pappi, 4783. Ocule Cusai; in bush on Mount Metatée, 8200 ft., Pappi, 1585; Halai, 8500 ft., Pappi, 1670. Abyssinia: Tigre; among rocks on the upper part of Mount Scholoda, Schimper, 97! Amba Harres, 8200 ft., Schimper, 991! Samen, "montes Cojetani," Schimper, 1820! between Maigoigoi and Debra Sina,

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Quartin-Dillon & Petit! and without precise locality, Schimper, 1063! Quartin-Dillon & Petil, 200! Uganda: Ruwenzori; Kasamaga, 5300 ft., Scott Elliot, 7596! Entebbe, Fyffe, 184! Kipayo, 4000 ft., Dummer, 2450! British East Africa: without precise locality, Powell, 13!

Mozambique Distr. Nyasaland: Zomba, 2900 ft., Manning, 98! 4000-6000 ft., Whyte! Cholo Mountain, Adamson, 196! Rhodesia: Salisbury,

Mundy! Allen, 698! Bulawayo, Appleton, 4!

Var. major, Stapf. Culms robust, up to 10 ft. high. Leaves in all parts firmer; the sheaths sometimes hirsute and the blades, though rarely, softly hairy, the latter firmer and more rigid, up to over 2 ft. long and up to 7 lin. wide; inflorescences longer (up to 2 ft.) with the racemes up to over 10 in. long; spikelets exactly as in the type.—D. diagonalis, Rendle in Cat. Afr. Pl. Welw. ii. 163; Cheval. Sudania, 77. Panicum uniglume, Jardin, Herbor. 7 (nudiglume); Franch. Contrib. Fl. Congo Franç. 38. P. diagonale, De Wild. Miss. E. Laurent, 201; Th. & Hél. Durand, Syll. Fl. Congol. 631 (incl. vars. hirsutior and uniglume), not of Nees. *P. diagonale*, yar. *uniglume*, Hack. in Durand & Schinz, Consp. Fl. Afr. v. 747 (partly) and Etudes Fl. Congo, 322; De Wild. Contrib. Fl. Congo, i. fasc. ii. 72; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i. 61; Hack, in Oest, Bot, Zeit, 1901, 332. P. diagonale, var. hirsutum, De Wild. & Durand, Pl. Thonner. Congol. 4.

Upper Guinea. Southern Nigeria: Lagos, MacGregor, 208! Cameroons: Yaunde, Zenker!

North Central. French Equatorial Africa: at the junction of the Oubangui

and Kemo Rivers, Chevalier, 5363!

Nile Land. Bongo: Gurfala, Schweinfurth, 2243! Niamniam: by the Ibba River near Nganye, Schweinfurth, 3973! Uganda: in grass land near Kivuma, 4000 ft., Dummer, 534! Nandi country; Sibu, James! Elgon District, James! and without precise locality, Maitland, 70 AB! Fyffe, 158!

Lower Guinea. Gaboon: Loango, Jardin. Belgian Congo: Stanley Pool District; Dolo, Laurent; Kisantu, Gillet; Stanley Pool, Demeuse; Kunzulu, Vanderyst, 5198 partly! Kitebe, Vanderyst, 4086! Kwango District; Nyungu, Vanderyst, 3229! Misai, Vanderyst, 2635! Bangala District; Yabasumba, Thonner, 82. Katanga District; in dry wooded country near Chisangwe, Homblé, 36! Angola: Pungo Andongo, Welwitsch, 2859! 2871! River Cuanza. near Guigenga, Gossweiler, 6325! Mozambique Distr. Nyasalan

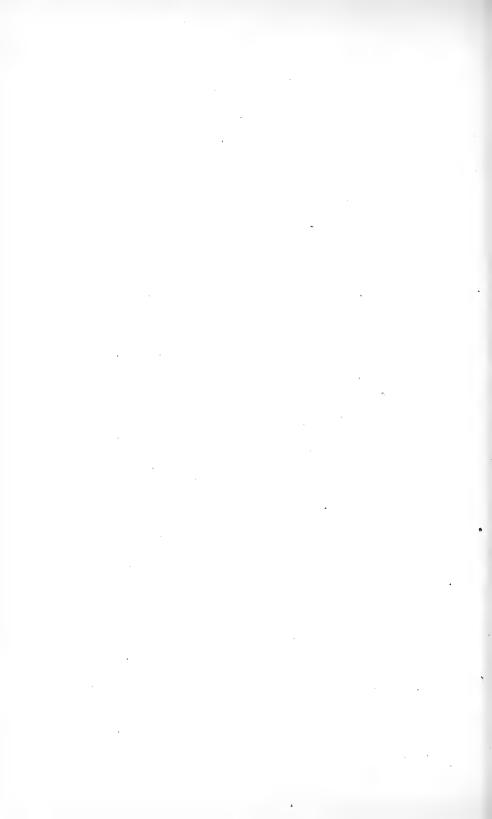
Nyasaland: Cholo Mountain, Adamson, 196! Shire

Highlands, Buchanan, 45! Nyika plateau, 6000-7000 ft., Whyte!

The var. major and the typical form of D. uniglumis represent apparently climatic or edaphic modifications. Adamson's specimen is intermediate, combining the lower stature and shorter leaves of the type with the long paniele and the more copious indumentum of var. major. \(\forall D. \) diagonalis, Stapf (Panicum) diagonale, vars. genuinum and robustius, Hack. in Durand & Schinz, Consp. Fl. Afr. v. 746, 747) is confined to South Africa and characterized by considerably larger spikelets (1½ lin.).

44. D. minutiflora Stapf. Annual, about $1\frac{1}{2}$ -2 ft. high. Culms in scanty fascicles or solitary, erect or ascending from a short sometimes rooting base, very slender, simple or more often sparingly branched below, 4–6-noded, glabrous, terete. Leaf-sheaths rather loose, glabrous or the lowest more or less shortly hirsute, striate and the lower slightly keeled upwards; ligules very short, scarious, truncate, glabrous, brown; blades linear from an equally broad base, tapering to a slender fine point, 6-12 in. by 2-3 lin., flat, flaccid, glabrous, green, very slightly rough, at least on the upper side and along the margins, midrib very slender, primary lateral nerves very fine, about 3 on each side. Racemes usually over 10





and up to 25, sessile, fascicled or solitary on a slender upwards angular and scaberulous common axis of variable length (1-3 in.), very slender, slightly curved or flexuous or almost straight, those from the lower nodes often very unequal or (rarely) compound, the longer 3-5 in. long and often subfastigiate, obliquely erect or spreading, rather loose; rhachis very slender, straight or slightly wavy, about ½ lin. wide, triquetrous, lateral angles with fine green or purple margins, very scabrid or rigidly ciliolate, internodes \(\frac{3}{4}-1\) lin. long; pedicels 4-2-nate, unequal, the longest up to 1 lin. long, angular, very scabrid and nearly always with a few fine white setæ from near the tips, exceeding the spikelet. Spikelets ovate- to elliptic-oblong, subacute, $\frac{2}{5} - \frac{1}{3}$ lin. by up to $\frac{1}{4}$ lin., greyish or whitish-green on the flat side, chestnut-brown and at length very dark and more or less glossy on the convex side, quite glabrous. Lower glume suppressed; upper reduced to a minute hyaline whitish rounded or truncate appressed scale, rarely much more than $\frac{1}{20}$ lin. long. Lower floret: valve oblong, obtuse, appressed to the face of the upper floret and as long as or slightly shorter than the same, 3-nerved; valvules and Upper floret corresponding in size and outline to the spikelet, very convex on the back, chartaceous, tough, longitudinally very finely punctate-striate. Anthers \frac{1}{7} lin. long.—Panicum minutiflorum A. Rieh. Tent. Fl. Abyss. ii. 362, and in Walp. Ann. iii. 715; Steud. Syn. Pl. Glum. i. 41; Engl. Hochgebirgsfl. Trop. Afr. 117; Durand & Schinz, Consp. Fl. Afr. v. 754 (partly); Hack. in Oest. Bot. Zeit. 1901, 330, 332; Chiov. in Ann. Istit. Bot. Roma, viii. 294; not of Figari & De Not., nor of Benth.

Upper Guinea. French Guinea: common on cultivated ground near Timbo,

Pobéguin, 1701!

Nile Land. Eritrea: Sarae; Gundet on the Mareb River, 5575 ft., Pappi, 344; Medri od Tesfa; Adi Ghebsus, Pappi, 6595; Mumat Mahater, Pappi, 6740. Abyssinia: Hamado, in swamps, Schimper, 996! in a dried up stream near Jelajerenne, Schimper, 799! Begemeder; slopes above Reb River, Schimper, 1550! Lower Guinea. Belgian Congo: Katanga; Elisabethville, Rogers, 10994!

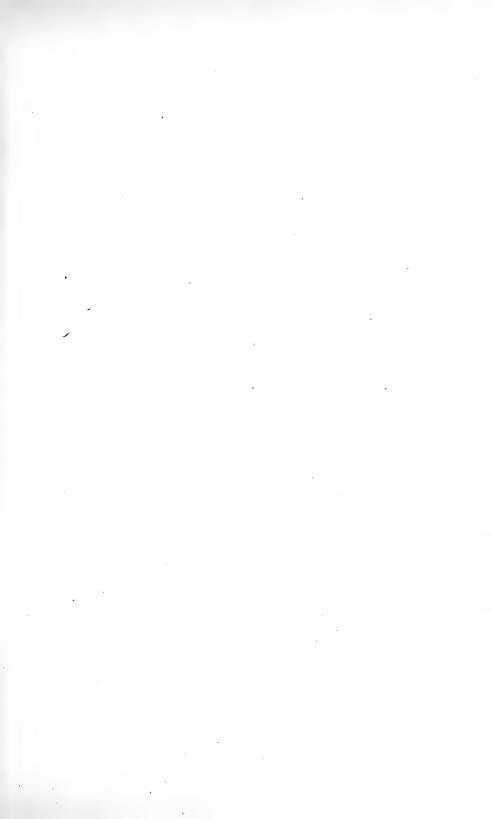
45. **D. Myurus**, Stapf. Perennial, compactly caspitose, with intravaginal innovations, up to $2\frac{1}{2}$ ft. high. Culms slender, erect, simple, 2-noded, the upper node 3–5 in. above the ground, hairy all along but particularly upwards. Leaves mostly crowded at the base; sheaths rather tight, the lowest short, densely greyish-tomentose at the base, persistent, at length more or less breaking up and forming a dark coating at the base of the culms, the upper softly and shortly hirsute, the uppermost over 6 in. long; ligules membranous, ovate, $1-1\frac{1}{2}$ lin. long, ciliate; blades linear, long-attenuated to a fine point, those of the barren shoots long-narrowed towards the base, up to over 9 in. by $2-2\frac{1}{2}$ lin., or those of the culms much shorter, somewhat firm, green, shortly and finely hirsute and slightly rough, midrib and lateral nerves fine, somewhat prominent. Racemes mostly compound, at least downwards, 5–6, sessile or subsessile, gathered into

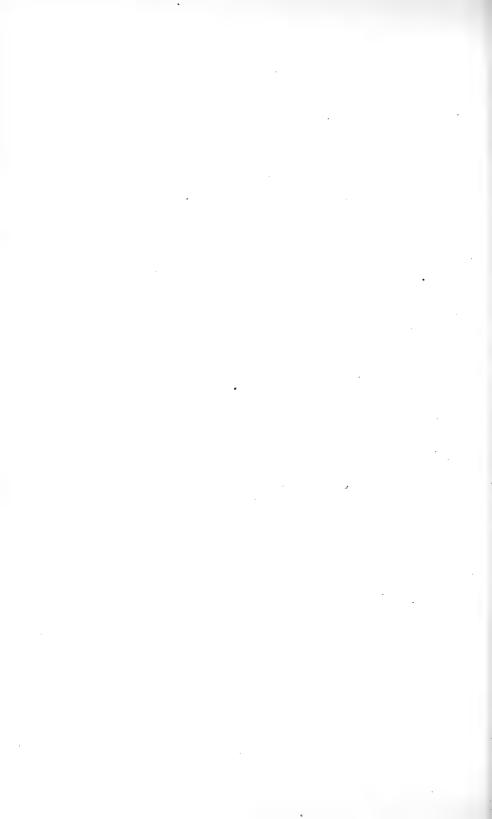
No

a spiciform panicle which is 4-5 in. long, on a greyish silky common axis (1-3 in. long) and more or less appressed to it, solitary or 2-3-nate and then mostly unequal, the longer rarely much over 1 in. long, silky; primary rhachis slender, subtriquetrous, about $\frac{1}{5}$ lin. wide, lateral angles very scabrid and ciliate, narrowly marginate, secondary similar but still narrower and more filiform; pedicels and short tertiary rhachises if present forming dense fascicles of up to 15 spikelets, of unequal length, the longest pedicels rarely over 1 lin. long, but mostly much shorter, angular, scabrid and bearing upwards fine soft whitish hairs slightly exceeding the spikelets. Spikelets oblong, acute, 1 lin. by $\frac{2}{5}$ lin., very convex on the back, glabrous, greyish or brownishgreen on the flat side, dark chestnut- to blackish-brown and shining on the convex side. Lower glume suppressed; upper a hyaline truncate crenulate or lobulate whitish nerveless scale tightly appressed to the base of the spikelet, $\frac{3}{10}$ lin. long. Lower floret: valve oblong, obtuse or subobtuse, almost equalling the spikelet, membranous, whitish, 3- to sub-5-nerved; valvule and lodicules very minute. Upper floret corresponding to the spikelet in outline and size: valve subcoriaceous except the contiguous or slightly overlapping margins, closely and finely striate. Anthers $\frac{6}{10}$ lin. long, purple.

Mozambique Distr. German East Africa : Kyimbila ; in mountain meadows near Rulongwe, 6900 ft., Stolz, 2619!

46. D. intecta, Stapf. Annual, up to 3 ft. high. Culms somewhat slender, erect or geniculate at the base, solitary, simple or with a branch from one of the lower nodes, up to 5-noded, glabrous, uppermost internode by far the longest. Leaf-sheaths rather loose, striate, more or less beset with stiff tubercle-based hairs (particularly upwards) to glabrous, frequently bearded at the upper nodes; ligules short, up to 1 lin. long, scarious, truncate, glabrous; blades linear from an equally wide base, up to 1 ft. by 3 lin., flat, flaccid, green, glabrous or sparingly hairy (near the base), rough on the upper side and the margins, midrib whitish, prominent on the back, flat and widened towards the base on the face, primary lateral nerves about 3-4 on each side, fine. Racemes 8-20 gathered into a subfastigiate paniele 5-8 in. long, sessile, on a slender upwards angular and rough common axis of varying length (1-3 in.), very slender, in scanty fascicles or false whorls or solitary, the lowest sometimes subcomposite, about 4 in. long, slightly flexuous to almost straight, rather loose at least upwards; rhachis very slender, slightly wavy or straight, triquetrous, $\frac{1}{7}$ in. wide, lateral angles narrowly marginate, very scabrid, internodes up to over 1 lin. long; pedicels 4-2-nate, unequal, the longest up to 1 lin. long, angular, very scabrid with fine white setæ from near the tips, as long as the spikelets or slightly longer. Spikelets elliptic-oblong, acute, $\frac{6}{10} - \frac{7}{10}$ lin. long, pale to deep chestnut-brown, shining. Lower and upper glume quite suppressed. Lower floret reduced to a rotundate hyaline 1-nerved scale, $\frac{1}{5}$ lin.





long, appressed to the face of the upper floret. Upper floret corresponding in shape and size to the spikelet: valve chartaceous to subcoriaceous, very finely longitudinally punctate-striate, the whitish conspicuous margins of the valve contiguous to low down. Anthers up to $\frac{1}{3}$ lin. long.—Panicum minutiflorum, Durand & Schinz, Consp. Fl. Afr. v. 754 (partly).

Nile Land. Abyssinia: Gallabat; a weed in gardens at Matamma, Schweinfurth, 1156! Tigre or Begemeder; without precise locality, Schimper, 996!

Imperfectly known species.

47. D. nuda, Schumach. in Schumach. & Thonn. Beskr. Guin. Pt. 45. Culms geniculate at the base, rooting, glabrous, with trigonous internodes I in. long. Leaves glabrous; sheaths loose; ligules very short, slightly hairy; blades lanceolate, 1-3 in. by ½ lin. Racemes 5-7, digitate, filiform, 3-4 in. long. Spikelets subsolitary, oblong-lanceolate. Upper glume and barren valve prominently nerved, scaberulous.

Upper Guinea. Gold Coast, Thonning.

The name "nuda" refers to the non-bearded nodes. I cannot place this.

48. D. reflexa, Schumach. in Schumach. & Thonn. Beskr. Guin. Pl. Culms terete, 1½ ft. high, with beards of long reflexed hairs at the nodes. Leaves hairy; ligules very short, membranous; blades lanceolate, 3-4 in. by 3 lin., with crisped margins. Racemes racemosely arranged, the lower in whorls of 5, the others 2-3 nate, filiform. Spikelets solitary or 2-nate, oblong-lanceolate, glabrous. Upper glume and barren valve striate.

Upper Guinea. Gold Coast, Thonning. Said to be allied to D. ægyptiaca.

. Endlichin Min

49. D. pyriformis, Chiov. in Result. Scient. Miss. Stefanini-Paoli, i. 225. Perennial, with a very short horizontal whitish rhizome and extravaginal innovations which are pear-shaped when young and covered with densely silky cataphylls. Culms up to almost 5 ft. high, 5-6-noded, quite glabrous, the lowest 1 or 2 internodes very short and bulbously thickened. Leaf-sheaths longer than the internodes, sparsely hairy, particularly upwards; ligules membranous, up to 1 lin. long, truncate; blades lanceolate-linear, long-narrowed towards the base and long-tapering upwards, 16-28 in. by 3-4 lin., glabrous except for some long hairs near the ligule, midrib whitish, nerves and margins scabrid. Racemes 8-13, in 2 or 3 imperfect whorls, filiform, 4-7 in. long, horizontally spreading; rhachis much compressed, narrowly winged, up to $\frac{2}{10}$ lin. wide, angles denticulate-scabrid; pedicels 2-nate, slender, subtrigonous, scaberulous, flexuous, with discoid tips, unequal, the longer up to $2\frac{1}{2}$ lin. long. Spikelets ovate-lanceolate, 1 lin. long, silky. Lower glume a minute hyaline subquadrate membrane, upper linear-lanceolate, equalling two-thirds of the spikelet, 3-nerved, appressedly hairy between the nerves and along

the margins, hairs white, not clavate, the upper much exceeding the glume. Lower floret corresponding in size and outline to the spikelet, subobtuse, prominently 5–7-nerved, with lines of hairs between the inner side-nerves and along the margin. Upper floret as long as the spikelet, lanceolate, acute, with a convex almost keeled back, at length turning brown.—Panicum piriferum, Chiov. in Ann. Istit. Bot. Roma, viii. 295.

Nile Land. Eritrea: Amasen; Dongolla near Ghinda, Pappi, 4236!

According to Chiovenda allied to D. argyrograpta, Stapf; but the description of the basal parts of the grass and the inflorescence rather recalls D. pennata.

Whilst this and the preceding sheet were passing through the press Dr. Chiovenda's papers "Gramina nova ex Catanga" (in Ann. di Bot. xiii. pp. 35-58) and Resultati Scientifici della Missione Stefanini-Paoli, vol. i. Le Collezioni Botaniche (Pubbl. Istit. Stud. Sup. Firenze), came to hand. They contain the following new species and varieties:—D. siderigrapta, D. Bovonii, D. Parlatorei, vars. phæotricha and microstachya, D. sulcigluma from Katanga, and D. somalensis and D. gallaensis from Somaliland and the Arussi country respectively. These species as well as those belonging to genera dealt with in the earlier parts of this volume will be taken up in the addenda.

53. CHLORIDION, Stapf in Hook. Ic. Pl. t. 2649.

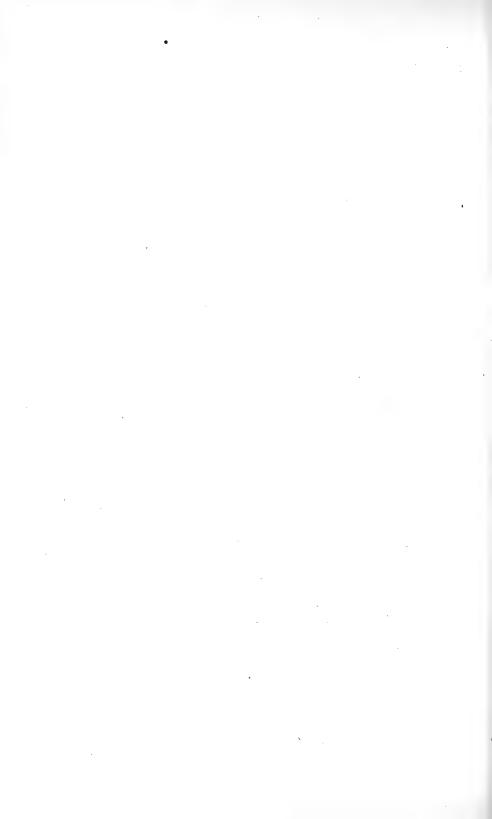
Spikelets lanceolate, acute, flat in front, convex on the back, falling entire from the pedicels, 2-nate, secund and abaxial on the triquetrous winged rhachis of slender spiciform racemes; lower floret barren, reduced to the valve and a very minute valvule, accompanied by equally minute lodicules; upper floret shorter than the lower, \S . Lower glume quite suppressed, upper reduced to a small hyaline scale. Barren floret: valve determining the outline and size of the spikelet, long-awned from the tip, finely 2-keeled upwards. closely and prominently 7-nerved, thin between the nerves. Fertile floret: valve awnless, thinly chartaceous with hyaline margins. faintly 3-nerved; valvule equal to the valve, embraced by it all along, faintly 2-nerved, of the same texture. Lodicules 2, minute, broadly cuneate. Stamens 3. Ovary oblong-ovoid; styles connate towards the base, long; stigmas short, exserted near tip of spikelet. linear-oblong, dorsally compressed; hilum subbasal; scutellum half the length of the grain.—Perennial; leaf-blades linear, flat, ligules membranous; racemes sessile or subsessile, digitate, suberect. Spikelets very numerous, imbricate, coloured.

Species 1, endemic in tropical South Africa.

1. C. Cameronii, Stapf in Hook. Ic. Pl. t. 2640. Perennial, cæspitose on a very short rhizome with mostly extravaginal innovations. Culms 1 to over 3 ft. high, slender to somewhat stout, terete, erect or geniculate, 5–7-noded, lower and intermediate internodes usually shorter than the adjacent sheaths, the uppermost long-exserted. Leaf-sheaths terete and tight, or the lower more or less compressed and loose, hirsute or the upper, rarely all, subglabrous or glabrous, very finely striate; ligules ciliolate; blades linear from an equally

= Sterochlasma Hack

Chloridian Stoppingor mat Calartinon Linksy fungi



wide or slightly narrowed base, long-tapering to an acute point, up to 8 in. by 2-4 lin., or in stunted specimens $1\frac{1}{2}$ -2 in. by $1\frac{1}{2}$ -2 lin., flat, pale or glaucous-green, hirsute on both sides, or glabrous below, margins cartilaginous, rough, midrib very slender, nerves numerous, close, finely rough above. Racemes 4-8 (rarely 2 or 3), slender, straight or somewhat flexuous, $1\frac{1}{2}-5\frac{1}{2}$ in. long; rhachis up to $\frac{2}{5}$ lin. wide, puberulous on both sides, wings scabrid or ciliate, greyishgreen; pedicels scabrid, the longer about ½ lin. long. Spikelets $1-\frac{1}{2}$ lin. long (excluding the awn), pale greyish or brownish-green. Upper glume ovate, acute or mucronulate, $\frac{1}{6}$ lin. long, pale, 1nerved or nerveless. Lower floret: valve spinulously ciliolate on the keels, very scabrid along all the nerves, awn very fine, straight, 3-5 lin. long, often purplish; valvule square, up to almost $\frac{1}{10}$ lin. long. Upper floret linear-oblong, acute, $\frac{4}{5}$ -1 lin. long, brown, early darkening except at the pale or whitish margins. Anthers $\frac{2}{5} \frac{3}{4}$ lin. long. Grain whitish, $\frac{3}{4} \frac{1}{3}$ lin. long.—Stereochlæna Jeffreysii, Hack. in Proc. Rhod. Scient. Assoc. vii. ii. 66, and in Fedde, Repert. vi. 321; Eyles in Trans. Roy. Soc. S. Afr. v. 301.

Mozambique Distr. Nyasaland: Shire Highlands, Buchanan, 7! Mount Chiradzulu, near the summit, Cameron, 180! N'tondwe Cameron, 167! Namasi, Cameron, 15! 20! Mount Mlanje, Adamson, 403! North Nyasaland, without precise locality, Whyte! Rhodesia: Bulawayo, Jeffreys, 46, 83. Bulawayo and Matoppo Hills, Appleton, 13! North Mazoe District, Mundy and without precise locality, Allen, 739! 750!

54. ACRITOCHÆTE, Pilg. in Engl. Jahrb. xxxii. 53.

Spikelets lanceolate, acute, falling entire from the pedicels, solitary, secund and distichous on the rhachis of slender spiciform racemes; lower floret barren, reduced to the valve, upper \(\frac{1}{2}\). Lower glume minute, upper embracing the base of the barren floret, shorter than it and produced into a long twisted awn. Lower floret: valve as long as the spikelet, with an awn like that of the upper glume, 3-nerved. Upper floret \(\frac{1}{2}\): valve awnless, thinly chartaceous, 5-nerved; valvule 2-keeled. Lodicules 2, truncate. Stamens 3. Ovary narrowly ovoid; styles connate at the base; stigmas plumose. Grain unknown.—Annual, with decumbent much-branched culms; leaf-blades lanceolate, thin; ligules firm and short; racemes 2-3, distant on a common axis, or solitary.

Species 1, endemic.

1. A. Volkensii, Pilg. in Engl. Jahrb. xxxii. 54. Culms slender, erect from a decumbent rooting much-branched base, 1-1½ ft. high, glabrous, smooth, with all the branches flowering. Leaf-sheaths tight, glabrous, smooth, mostly much shorter than the internodes; ligules rotundate-obtuse; blades erect, lanceolate, long-tapering to a setaceous point, contracted at the base into a stout puberulous or almost glabrous very short petiole, thin, glabrous or very sparingly hairy,

with scabrid margins; midrib pale, primary lateral nerves 3 on each side. Racemes dense, distant by less than their own length, erect and appressed to the common axis, the whole inflorescence up to 4 in. long; rhachis very slender, straight or flexuous, glabrous, terete or sulcate on the face; pedicels terete, the lower up to 1 lin. Spikelets whitish-glaucous, 3 lin. long (excluding the awns). Lower glume truncate, nerveless, up to $\frac{3}{8}$ lin. long, sometimes obsolete; upper lanceolate, embracing the barren floret with its rounded base but narrower upwards than it, 2 lin. long, with few white bristles, awn very fine, up to 14 lin. long, scabrid at the base, minutely setulose towards the tips. Lower floret: valve lanceolate, 3 lin. long, embracing the upper floret with its inflexed margins, with some whitish bristles from the back, awn similar to that of the upper glume but rather shorter, usually entangled with it and other awns. Upper floret slightly shorter than the lower: valve ovate-lanceolate, acute, almost colourless, smooth, glabrous, middle nerve green, rather prominent, side-nerves approximate; valvule thin, acute, as long as broad. Anthers stout. Stigmas whitish.

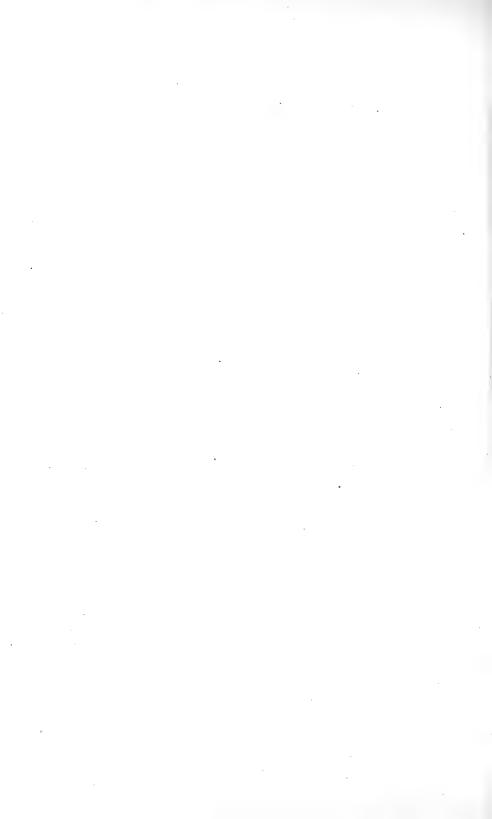
Mozambique Distr. German East Africa: Kilimanjaro, in forest above Marangu, common at 6900 ft., *Volkens*, 1278.

I have not seen a specimen of this remarkable plant and am altogether doubtful as to its true affinities. Pilger also says that he cannot see a distinct relationship between *Acritochæte* and the small genera grouping around *Panicum*, but that Hackel thought it most nearly allied to *Chætium*.

ALLOTEROPSIS, Presl, emend. Hitchc. in Contrib. U.S. Nat. Herb. xii. 210.

Spikelets ovate or elliptic to lanceolate-oblong, acute or acuminate, mostly awned, slightly or conspicuously compressed from the back, falling entire from the pedicels, 2-nate or fascicled, subsecund and abaxial on the triquetrous rhachis of more or less spiciform digitate or subdigitate racemes; lower floret usually \mathcal{L} , upper floret \mathcal{L} . Glumes unequal, lower smaller, membranous to hyaline, 3-1-nerved, very acute, often mucronulate, upper equal or subequal to the spikelet, membranous to chartaceous, 5-nerved with the outer nerves submarginal, densely ciliate along them. Lower floret: resembling the upper glume, but eciliate, the tip minutely truncate and the lateral nerves approximate to each other and in or near the marginal flexure; valvule short, deeply 2-fid with conspicuously auricled flaps. Upper floret: valve chartaceous, glabrous, delicately ciliolate upwards, 5-nerved, produced into a straight awn or mucronate; valvule equal to the valve, 2-keeled, with broadly auricled flaps. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted. Grain enclosed by the valve and valvule, elliptic-oblong, dorsally much compressed; scutellum about half the length of the grain; hilum basal, punctiform.—





Perennial or annual; leaf-blades flat or more or less convolute; ligules membranous, ciliate or ciliolate, short or reduced to a mere rim; racemes sessile or peduncled, often more or less compound towards the base, digitate or subdigitate on a more or less elongated common axis.

Species about 5, in the tropics and the warm temperate zone of the Old World.

As Hitchcock (Contrib. U.S. Nat. Herb. xii. 210) has pointed out, Presl's description and analyses of Alloteropsis are based on a composition of a Panicoid and an Andropogonoid grass, whilst the original in Presl's herbarium is undoubtedly the plant described here as A. semialata, and so is also the habit figure (1) in Presl's plate. The genus is therefore accepted here with Hitchcock's emendation.

Another member of this genus, A. cimicina, was included by Palisot de Beauvois (Agrost. 12) in his genus Axonopus under its earliest synonym Milium cimicinum and as "A. cimicinus?" on p. 154, and this led J. D. Hooker (Fl. Bril. Ind. vii. 64) to use the name Axonopus in preference to Alloteropsis, a view which was adopted by myself in Fl. Cap. vii. 418. From P. Beauvois' diagnosis, however, and from the fact that he quotes in the first place "Milium compressum" as example for Axonopus, there can be no doubt that he had primarily Milium compressum in view when establishing his genus Axonopus, and it is in that sense that the genus is understood in this work (see below). A. cimicina also forms the basis of another genus, Coridochloa, Nees in Edinb. New Phil. Journ. xv. 381. A. Chase (in Proc. Biol. Soc. Washington, xxiv. 157) maintains this genus as distinct from Alloteropsis, and I followed her when drawing up the key of the genera of Tropical African grasses (p. 13); but I have since come to the conclusion that the species referable to these two groups are so similar in the peculiar structure of their spikelets that they are better merged into one genus for which Alloteropsis has priority over Coridochloa.

Perennial; leaf-blades narrow all along or at least towards the base and there passing gradually into the sheath; spikelets only moderately compressed from the back, their upper glume and lower valve chartaceous, the latter with the exception of a triangular transparent area at the base.

Spikelets mostly between $2\frac{1}{4}$ and 4 lin. long; awn up to $1\frac{1}{2}$ lin. long 1. A. semialata.

Spikelets $1\frac{1}{2}$ lin. long, with a short mucro from the fertile floret 2. A, angusta.

Annual; leaf-blades lanceolate, cordate or rounded at the base; spikelets flat, conspicuously compressed from the back; their upper glume and lower valve membranous, the latter thin throughout or with a hyaline transparent zone at the base.

Spikelets lanceolate-oblong, acuminate, $1\frac{3}{4}-2$ lin. by $\frac{1}{2}$ lin., awn $1\frac{1}{2}-2\frac{1}{2}$ lin. long 3. A. paniculata.

Spikelets ovate to elliptic, acute, $1\frac{1}{2}$ lin. by $\frac{1}{2}-\frac{3}{4}$ lin., awn rarely over 1 lin. long 4. A. cimicina.

1. A. semialata, *Hitchcock in Contrib. U.S. Nat. Herb.* xii. 210. Perennial, compactly exspitose on a short rhizome with a thick basal coat of silky-tomentose sheath-bases or their remains; innovations intravaginal. Culms erect, simple, 1 to over 3 ft. high, 2–3-noded with the uppermost internode long-exserted, terete, glabrous or sometimes more or less hairy. Leaf-sheaths tight, strongly striate,

the basal crowded, very firm and more or less silky-tomentose (often very densely so) downwards, forming a dense persistent ultimately glabrescent hard coat, upper terete, glabrous except at the pubescent or shortly bearded nodes and the ciliate outer margin or more or less finely hairy to almost villous; ligules reduced to a ciliate rim; blades linear from a more or less narrowed base, long-tapering to a sharp acute point, from a few inches to over 1 ft. long, $1\frac{1}{2}$ -3 in. wide, convolute or flat, very firm, rigid, glabrous or more or less loosely hairy or ciliate along the lower margins, hairs and cilia tuberclebased, strongly and closely nerved, midrib very slender. florescence mostly of 2 or 3, more rarely 4 or 5 digitate racemes, or occasionally reduced to a solitary raceme; racemes springing from a silky-pubescent node, subtrect or obliquely spreading, usually stiff, $1\frac{1}{2}$ -8 in. long, with or without a bare base, secund or subsecund, dense or rather loose and downwards interrupted; rhachis slender, straight or very slightly wavy, triquetrous, $\frac{1}{5} - \frac{1}{3}$ lin. wide, scabrid on the angles, scaberulous or puberulous between them or with longer hairs particularly downwards; pedicels mostly 2-nate, sometimes solitary owing to the arrest of the secondary spikelet, or 3-4-nate or fascicled with a very small secondary raceme on the lowest nodes, angular, scaberulous or puberulous, or with some longer additional hairs, the longest up to 2, rarely 3 and even 4 lin. long, tips subcupular. Spikelets ovate-lanceolate to ovateoblong, shortly and acutely acuminate, dorsally moderately compressed, 2-3 lin. long, greenish or variously tinged with brown or purple. Lower glume ovate, acutely acuminate, mucronulate, $1\frac{1}{4}$ - $1\frac{1}{2}$ lin. long, membranous, 3-nerved, glabrous or very minutely pubescent, upper firmer, of the outline and size of the spikelet, densely ciliate along the margins with the cilia short and usually appressed, rarely over ½ lin. long and spreading, 5-nerved. Lower floret of the same length as the spikelet: valve similar to the upper glume, but glabrous, with a minutely truncate tip, more approximate side-nerves and a distinctly chartaceous texture with the exception of a triangular delicately hyaline and perfectly transparent portion at the base, sometimes mottled with brown or with faint brown transverse bands; valvule slightly over 1 lin. long, deeply 2-fid, flaps with obtuse ovate auricles extending to above the middle. Upper floret almost as long as the lower: valve lanceolate, acuminate, chartaceous, 5-nerved, delicately ciliolate, produced into a mucro or fine bristle, up to $1\frac{1}{2}$ lin. long; valvule with ovate acute auricles. Anthers 1½ lin. long. Grain elliptic-oblong, dorsally much compressed, over $1\frac{1}{4}$ lin. by $\frac{2}{3}$ lin.; scutellum rather large, reaching to the middle of the grain.—A. Chase in Proc. Biol. Soc. Wash. xxiv. 159. A. distachya, Presl, Rel. Haenk. i. 344, t. 47; Steud. Syn. Pl. Glum. i. 404. Panicum semialatum, R. Br. Prodr. 192; Benth. Fl. Austr. vii. 472; Thwaites, Enum. Pl. Zeyl. 358; Durand & Schinz, Consp. Fl. Afr. v. 764. P. viaticum, Griff. Ic. Pl. As. t. 145, fig. 2.





Urochloa semialata, Kunth, Rév. Gram. i. 31, and Enum. i. 74. Oplismenus semialatus, Desv. Opusc. 81. Coridochloa semialata, Nees in Edinb. New Phil. Journ. xv. 381. Aira viatica, Griff. Not. iii. 54. Holosetum philippicum, Steud. l.c. 118. Arundinella Schultzii, Benth. Fl. Austr. vii. 545.

Upper Guinea. French Guinea: between Mamou and Kindia Rivers, Chevalier, 13580! Timbo, Pobéguin, 1833!

Nile Land. Abyssinia: Gallabat; on the banks of the River Gendua,

Schweinfurth, 1079! British East Africa: near Uyui, Taylor!

Lower Guinea. Angola: Benguela; without precise locality, Gossweiter,

2670! Huilla: in damp pastures on Empalanca plain, Welwitsch, 2668!

Var. Ecklonii, Stapf. Usually more robust than the type. Leaf-blades narrow, or up to 4 lin. broad and at the same time short (3-5 in.). Racemes stout, mostly very dense from the base. Spikelets often slightly longer (up to 3½ lin.), plumper, dark brownish-purple or blackish-purple all over or with a pale first glume; lower valve usually with alternately darker and lighter transverse bands.—Bluffia eckloniana, Nees in Lehm. Ind. Sem. Hort. Hamb. 1835, and in Lindl. Nat. Syst. Bot. ed. ii. 447; Nees, Fl. Afr. Austr. 61. Panicum semialatum, var. ecklonianum, Hack. ex Durand & Schinz, Consp. Fl. Afr. v. 764. Axonopus semialatus, Rendle in Cat. Afr. Pl. Welw. ii. 184; A. semialatus, var. Ecklonii, Stapf in Dyer, Fl. Cap. vii. 418; Rendle in Journ, Linn. Soc. Bot. xl. 230; Wood, Natal Pl. t. 166. Paspalum semialatum, var. Ecklonii, Eyles in Trans. Roy. Soc. S. Afr. v. 299.

Lower Guinea. Belgian Congo: Katanga, Homblé, 8! Elisabethville,

Rogers, 10908! 10988!

Mozambique Distr. Nyasaland: Namasi, Cameron, 8! Zomba, 2500-3500 ft., Whyte! Shire Highlands, Adamson, 191! Scott Elliot, 8506! and without precise locality, Whyte, 80! Rhodesia: M'rewa, near water, Appleton, 32! Salisbury, Mrs. Craster, 3! Mundy! Nobbs, 673! Sawer, 27! Mashonaland; Inyanga District, Mundy! Insiza District, Mundy, 31! Gazaland: Melsetter, 6000 ft., Swynnerton. 6034! Mount Pene, 6500-7000 ft., Swynnerton, 1644! 6035! Portuguese East Africa: Beira, Swynnerton, 1597! between Boma and Inyamita, on the Lower Buzi, Swynnerton, 1583!

The typical form was originally described from Australia where it ranges over the North and East. It also occurs in New Caledonia, the Philippines and on the Asiatic Mainland from South China to India (sporadically as far as Ceylon and Kumaon). The variety seems to be confined to extratropical and tropical South Africa, and in a less marked form, to Madagascar. Chase, l.c., considers it as specifically distinct, but the differences are very slight indeed and confined to size and colour. Whyte no. 80 represents a pale green state of var. Ecklonii and very closely approaches certain Indian and Australian specimens. An odd modification with marginal fimbriate wings from the sides of the upper glume occurs both in the typical form and in var. Ecklonii. As a rule only a portion of the spikelets is so affected. This is the condition figured by Griffith as Panicum viaticum (Aira viatica in the text). The width of the wings, which are quite chartaceous, varies much.

2. A. angusta, Stapf. Perennial, about 2 ft. high. Culms very slender, erect or geniculately ascending, about 4-noded, all but the lowest internodes exserted, the uppermost to up to over 1 ft. long, glabrous, slightly rough below the inflorescence. Leaf-sheaths tight, striate, smooth, glabrous except at the pubescent nodes; ligules reduced to a shortly ciliate rim; blades narrowly linear,

subacute, convolute, up to 3 in. by 1 lin. (when expanded), smooth, glabrous. Inflorescence of 2 slender suberect racemes, springing from a pubescent node; racemes bare at the base for \(\frac{1}{2}\)-1 in., straight or slightly flexuous, rather loose, 2-3 in. long, dark purple in all parts; rhachis very slender, triquetrous, up to $\frac{2}{10}$ lin. wide, scaberulous; pedicels 2-nate or 3-4-nate near the base, finely filiform, angular or subangular, scaberulous, the longest about 2 lin. long, tips discoid. Spikelets oblong, acute, dorsally slightly compressed, convex on both sides, slightly over 1½ lin. long, dark purple. Lower glume broadly ovate, subacute or acute, minutely and irregularly denticulate, $\frac{1}{2} - \frac{2}{3}$ lin. long, 3-nerved; upper firmer, of the outline and size of the spikelet, appressedly ciliate along the margins with the cilia short, purple or purple and white, finely 5-nerved, with minute asperities loosely scattered over the back. Lower floret 3: valve similar to the upper glume, but eciliate with a more acuminate very minutely truncate tip, more approximate side-nerves and a more or less chartaceous texture with the exception of a small triangular delicately hyaline and perfectly transparent area at the base; valvule not quite ½ lin. long, deeply 2-fid, flaps with large obovate subcrenulate auricles exceeding the keels. Upper floret almost as long as the lower; valve oblong, chartaceous to subcoriaceous, very faintly 5-nerved, produced into a fine oblique mucro; valvule with few very minute papillae on the back, with obtuse auricles. Anthers $\frac{3}{4} - \frac{7}{8}$ lin, long, orange.

Lower Guinea. Angola: country of the Ganguellas and Ambuellas, Gossweiler!

A somewhat imperfect specimen, collected by Homblé near Elisabethville (Katanga District; Belgian Congo) has the spikelets only 1_4^3 –2 lin. long with spreading fringes of rather long cilia and dark asperities on the back of the lower valve. In general appearance it is intermediate between A. semialata and A. angusta.

3. A. paniculata, Stapf. Annual, up to 3 ft. high. Culms solitary or in scanty fascicles, erect or geniculate and ascending and then often rooting from the lower nodes, simple or very sparingly branched below, 5–9- (or more-?) noded, terete, often rather stout, glabrous, finely striate. Leaf-sheaths at length loose, the lower slipping off the culm and finally decaying, terete, often purplish, striate, glabrous and smooth or more often more or less shortly hispidulous, the hairs from large persistent tubercles; ligules reduced to a rigidly and densely ciliate rim; blades lanceolate from a cordate or subcordate base, long-acuminate, 2–5 in. by 4–10 lin., softly herbaceous, glabrous, slightly rough above, margins cartilaginous and frequently strongly crisped, midrib very slender, whitish, lateral primary nerves 4–6 on each side, often indistinctly differentiated from the numerous secondary nerves. Inflorescence a fastigiate panicle of whorled or upwards scattered racemes, 4–8 in.





long, lowest whorls 5-8-nate; primary axis terete, smooth below, scaberulous upwards; racemes slender, subflexuous, the longest of the lowest whorl often reaching the top of the panicle, sometimes with very short secondary racemes downwards, bearing spikelets from the base or bare for $\frac{1}{2}$ -1 in., usually interrupted or loose in the lower part, denser upwards, secund; rhachis very slender, filiform, triquetrous, scaberulous; pedicels fascicled, up to 6, rarely more, in a fascicle (if as many or more, then mostly some imperfect), or upwards 3- or 2-nate, unequal, the longest about 1 lin. long, slender, subterete or slightly angular, scaberulous with subcupular tips. Spikelets dorsally much compressed, lanceolate-oblong, acuminate. $1\frac{1}{4}$ - $1\frac{1}{2}$ lin. long, greenish or reddish. Lower glume ovate, very acutely acuminate, $\frac{3}{4}$ lin. long, thinly membranous, 1-nerved, glabrous; upper of the outline and size of the spikelet, membranous, contracted into a slender very acute tip, 5-nerved, with a submarginal fringe of short appressed or only slightly spreading cilia. Lower floret of (always?); valve similar to the upper glume but glabrous, with the acumen minutely truncate and the lateral nerves approximate in or near the flexure, the back evenly hyaline throughout; valvule \(\frac{3}{8} - \frac{1}{2}\) lin. long, deeply 2-fid, flaps with oblong obtuse auricles slightly exceeding the keels; anthers orange, about \(\frac{3}{4}\) lin. long. Upper floret slightly shorter than the lower: valve oblong-lanceolate, acuminate, smooth, produced into a fine scaberulous bristle-like awn 2-3 lin. long; valvule with acute auricles; anthers as in the lower floret. Grain elliptic in outline, $\frac{2}{3}$ lin. by almost $\frac{1}{3}$ lin., flat, only slightly convex on the face; scutellum not quite half the length of the grain.—Urochloa paniculata, Benth. in Hook. Niger Fl. 558; Walp. Ann. iii. 713. Panicum Benthami, Steud. Syn. Pl. Glum. i. 43; Baker, Fl. Maurit. 439; Durand & Schinz, Consp. Fl. Afr. v. 741. Axonopus paniculatus, Stapf ex Cheval. Sudania, 22, 34, 154.

Upper Guinea. Sierra Leone: Mano, Thomas, 10646! French Sudan: San; on the banks of the River Bani, Chevalier, 1092! 2291! Southern Nigeria: in yam fields near Onitsa, Barter, 1756! Northern Nigeria: Stirling Hill, at the confluence of the Niger and Benue, Ansell!

North Central. Central Shari: Koulfe, Chevalier, 9209!
Lower Guinea. Belgian Congo: Kwango District; Bandundu, Vanderyst, 5159! Stanley Pool District; between Leopoldville and Mombazi, Gillet,

Mozambique Distr. Portuguese East Africa: Moramballa, on the banks of the River Shire, Kirk!

Also in Mauritius. - Corretochton

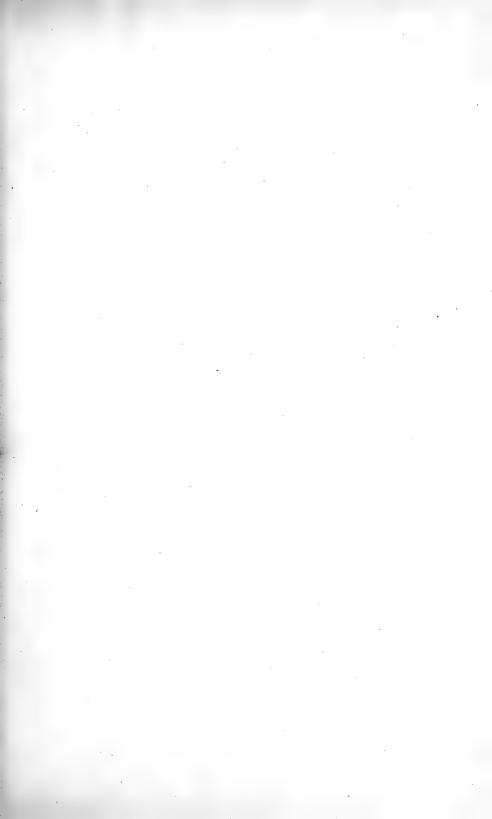
4. A. cimicina Stapf. Annual, 1 to over 2 ft. high. Culms solitary or more often fascicled, erect or shortly ascending from a subgeniculate base, mostly simple, 3-5-noded, terete, very slender to rather stout, glabrous or loosely hairy to hirsute with tuberclebased hairs, striate. Leaf-sheaths rather tight (the upper) or more or less loose, terete, striate, glabrous and smooth or more often finely hairy or hirsute with tubercle-based hairs, outer margin ciliate; ligules reduced to a densely ciliate rim; blades lanceolate from a cordate base, shortly acuminate or acute, \(\frac{1}{2}\)-3 in. by 2-9 lin., herbaceous, glabrous or with some scattered tubercle-based hairs, margins rigidly ciliate, cilia tubercle-based, spreading, midrib very slender, lateral primary nerves 2-6 on each side, hardly differentiated from the numerous secondary nerves, Inflorescence fastigiate, consisting of 2–6 strictly digitate racemes or the primary axis bearing higher up 1 to several scattered racemes; racemes slender, oblique, 2 to over 6 in, long, nearly always bare at the base for 1 in. or more, loose to very loose or denser upwards; rhachis very slender, triquetrous, scabrid; pedicels mostly 3-2-nate, more rarely solitary (upwards) or the lower 4-nate, angular, scaberulous with subcupular Spikelets dorsally much compressed but distinctly convex on the back in fruit, ovate to elliptic, acute, $1\frac{1}{2}$ lin. by $\frac{1}{2} - \frac{3}{4}$ lin., greenish. Lower glume ovate, long- and very acutely acuminate, $1-1\frac{1}{4}$ lin. long, thinly membranous, 3-nerved, glabrous; upper of the outline and size of the spikelet, membranous, acute, 5-nerved with a submarginal dense fringe of subappressed rarely ultimately spreading cilia, up to over 1 lin. long. Lower floret 3; valve similar to the upper glume but glabrous with the short tip minutely truncate, the lateral nerves approximate to or near the flexure, the back membranous and opaque except for a hyaline transparent zone at the base, with numerous globose papillæ; valvule \(\frac{3}{4} \) lin. long, deeply 2-fid, flaps with oblong obtuse auricles not exceeding the middle; anthers orange, $\frac{3}{4}$ lin. long. Upper floret almost as long as the lower; valve oblong, contracted into a mucro or a short bristle, up to 1 lin. long; valvule with subacute auricles; anthers as in the lower floret. Grain elliptic in outline, about 8-10 lin. by ½ lin., slightly convex on the face; scutellum not quite half the length of the grain.—Milium cimicinum, Linn. Mant. Alt. 184. Panicum cimicinum, Retz. Obs. iii. 9; Rottl. in Neue Schrift. Ges. Naturf. Freunde, iv. 191, 194; Roxb. Fl. Ind. i. 295; Steud. Syn. Pl. Glum. i. 43. P. conjugatum, Dalz. & Gibs. Bomb. Fl. 291. Axonopus cimicinus (?), Beauv. Agrost. 154; Hook, f. Fl. Brit. Ind. vii. 64; Hook, f. in Trim. Handb. Fl. Ceyl. v. 166; Cooke, Fl. Bomb. ii. 925. Urochloa cimicina, Kunth, Rév. Gram. i. 31, t. 103, and Enum. Pl. i. 74, Suppl. 56; Dalz. & Gibs., l.c. 289. Coridochloa cimicina, Nees in Edinb. N. Phil. Journ. xv. (1833) 381; A. Chase in Proc. Biol. Soc. Wash. xxiv. 158. C. fimbriata, Nees ex Wight, Cat. no. 1656; Wallich, Cat. no. 8749; Aitchison, Cat. Punjab Pl. 158.

Mozambique Distr. Portuguese East Africa: Nyasaland: Msalu River, Allen, 118: Rhodesia: North Mazoe District, Mundy!

Also in Madagascar and throughout India to Java.

56. CORIDOCHLOA, Nees.

(= 55. ALLOTEROPSIS, Presl, emend. Hitchcock.)





57. CHLOACHNE, Stapf in Hook. Ic. Pl. t. 3072.

Spikelets lanceolate, laterally compressed, somewhat turgid, falling entire from the pedicels, 2-nate, rarely 3-nate, secund and abaxial on the triquetrous slender rhachis of racemosely arranged spiciform racemes; lower floret barren or male, reduced to the valve and a usually more or less rudimentary valvule; upper floret shorter than the lower, \nothing . Glumes herbaceous-membranous, with a laterally much compressed herbaceous acute to very acute tip, hirsute, 5-nerved, the lower slightly shorter than the upper. Lower floret: valve very similar to the glumes, but longer and 7-nerved; valvule narrow, usually more or less reduced. Upper floret embraced and—except during flowering when it is laterally exposed—hidden by the valve of the lower floret, boat-shaped, acute to very acute and acuminate, thinly chartaceous, very smooth and shining, obscurely 5-nerved; valvule similar to the valve, clasped by its narrowly inflexed straight margins all along, 2-nerved. Lodicules 2, obliquely cuneate, crenulate. Stamens 3. Styles connate at the base, capillary; stigmata exserted from near the tip of the floret, Grain unknown.—Perennial; leaf-blades lanceolate with transverse veins; ligules thin, scarious; racemes simple or slightly compound at the base, sessile or the lower apparently peduncled owing to the arrest of the basal spikelets and the elongation of the lowest internode, arranged in a second panicle.

Species 1 or 2, endemic in tropical Africa.

1. C. secunda, Stapf in Hook. Ic. Pl. t. 3072. Culms ascending, sometimes emitting long flagelliform aerial roots from the nodes, many-noded, fistular, quite glabrous and smooth, the lower internodes up to over 3 in, long. Leaf-sheaths subherbaceous, more or less open, densely ciliate along the margins, with spreading tuberclebased hairs on the back and at the junction with the blade, or glabrous; ligules rotundate-truncate, i lin. long; blades lanceolate, acutely acuminate, contracted at the base into a mobile joint, which turns brown on drying, 3-4 in. by 7-10 lin., soft green, with scattered very short tubercle-based hairs on both sides and very fine long hairs on both sides of the midrib below, scaberulous along the margins, midrib slender, whitish, prominent and obtuse below, primary lateral nerves 3-4 on each side, like the secondary very fine, transverse veins numerous but delicate. Panicle 4-5 in. long, longexserted; common axis triquetrous, with cartilaginous almost smooth angles; lower racemes distant, up to $1\frac{2}{3}$ in. long, the upper approximate, much shorter, all solitary or the lowest 2-nate, their rhachis similar to the common axis, but slender, $\frac{1}{4}$ lin. wide, quite green, lowest internodes or bare base up to 3 in. long; pedicels subangular with subdiscoid tips, pruinose or scaberulous, the longer up to 1 lin, long. Spikelets $3\frac{1}{4}-3\frac{1}{2}$ lin, long. Glumes pale green with darker green tips, scaberulous-pruinose, the lower $2-2\frac{1}{4}$ lin., the upper up to 3 lin, long. Lower floret $3\frac{1}{4}-3\frac{1}{2}$ lin, long. Upper floret 2 lin, long. Anthers $1\frac{1}{4}$ lin, long. Stigmas yellowish, $1\frac{1}{4}$ lin, long.

Upper Guinea. Cameroons: Cameroon Peak, 4000 ft., Mann, 1354! 2101!

Inflorescences (some with the uppermost leaf attached) collected by Whyte in Nyasaland on the Masuku Plateau between 6000 and 7000 ft, may represent another species. The panieles are less distinctly secund, the racemes rather lax, the lower of them up to $2\frac{1}{2}$ in, long, whilst the upper are very rapidly decreasing in length, and the herbaceous spikelets gape more during flowering. There is also frequently a male flower with the lower floret. Finally the hairs along the midrib of the leaf-blades are fewer and almost setose.

58. MICROCALAMUS, Franch. in Journ. de Bot. iii. 282; not of Gamble.

Spikelets ovoid to lanceolate-ovoid or oblong, laterally moderately compressed or almost terete about the middle, falling entire from the pedicels, 3-2-nate or subsolitary (owing to the arrest of spikelets) on the slender triquetrous rhachises of loose simple or compound racemes, or in scanty panicles; lower floret barren or & with a well-developed valvule and a pair of lodicules; upper floret longer than the lower, $\mbox{\ensuremath}\amb}\amb}\amb}}}}}$ ceous, 5-7-nerved, much shorter than the spikelet. Lower floret: valve similar to the glumes but much longer and relatively narrower, acuminate; 7-nerved; valvule 2-keeled, slightly shorter than the Upper floret: valve subcoriaceous, rostrate- or subulateacuminate, 5-nerved, the beak slightly herbaceous; valvule 2-keeled below, rather delicate upwards, slightly shorter than the valve. Lodicules 2, truncate-obovate. Stamens 3. Ovary oblong, glabrous; styles free, long; stigmas plumose, exserted subapically. Grain ovoid-ellipsoid, terete about the middle; scutellum oblong, relatively small; hilum punctiform, basal.—Perennial with extravaginal innovations; culms sheathed at the base with more or less membranous often long cataphylls, erect, few-noded, frequently with their first or second internode very much elongated and resting on the ground, or obliquely ascending, then geniculate and suddenly erected; perfect leaves mostly few; their blades broadlanceolate, rather tough, contracted at the base into a pulvinus and articulated below it with the sheath, many-nerved with transverse veins; racemes often very much reduced and gathered into scanty and narrow panicles, or solitary, or the other extreme, much elongated with distant spikelets on a long common axis; spikelets pale, often more or less oblique.

Species 5, in tropical West Africa.

A peculiar genus, not unlike Puelia, but of typically panicoid structure. The species admitted here differ almost exclusively in vegetative characters. How

E. Annen and S. Hack Ding From



far these are dependent on external conditions is at present a matter of conjecture; but on the whole they seem distinctive enough to suggest the presence of genetically different types.

Leaves more or less hairy, at least when young, always pubescent at the sheath-nodes and with a dorsal ciliate transverse rim at the junction of sheath and blade.

Perfect leaves usually more than 2, and up to 8 with each flowering culm; their blades broad-lanceolate, 2–4 in. by $\frac{2}{3}$ –1 in., rather firm and somewhat rigid; nerves very close, mostly 60-70 per inch ...

... 1. M. barbinodis.

Perfect leaves 1-3 with each flowering culm, the blades with 35-50 nerves per inch.

Leaf-blades glabrous above, pubescent underneath, at least when young or towards the base, variously shaped; spikelets oblong in outline; lower floret obliquely and narrowly lanceolate in profile, its valve rather firm

... 2. M. Aspidistrula.

Leaf-blades with scattered fine glistening hairs springing from small tubercles on the upper surface, quite glabrous underneath, lanceolate, long-acuminate, 6-8 in. by $1\frac{1}{4}-1\frac{1}{2}$ in., thin, finely nerved; spikelets broad-oblong in outline; lower floret obliquely oblong in profile, its valve thinly chartaceous ... 3. M. convallari-

foides.

Leaves including the sheath-nodes quite glabrous; blades obliquely and broadly lanceolate, 7-9 in. by 2-5 in., their base usually very oblique and shortly attenuated, almost petioloid at the junction with the sheath, lateral nerves 30-50 per inch

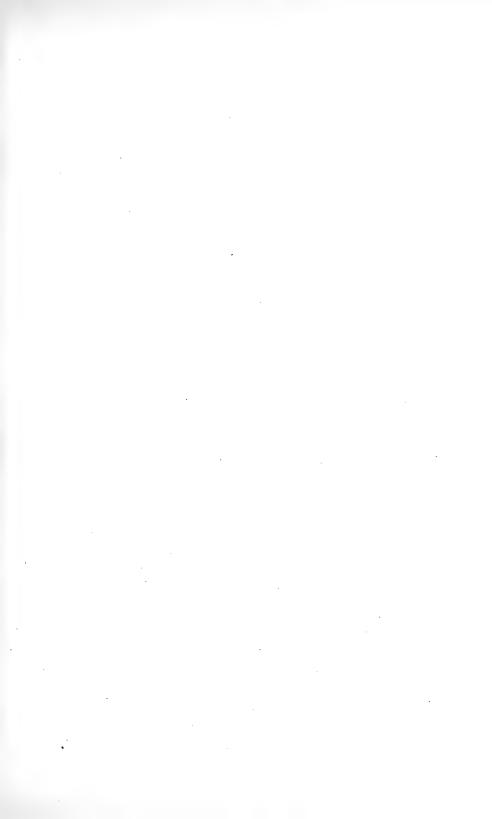
... 4. M. glaber.

1. M. barbinodis, Franch, in Journ, de Bot, iii, 282, with fig. Racemes slender, sheathed at the base by about 4 cataphylls, the lowest firm, very short, rounded, very strongly nerved, the following similar, but up to $3\frac{1}{2}$ lin. long, the third and fourth thinner and much elongated (the latter up to $1\frac{1}{2}$ in. long), all more or less appressedly hairy, at length glabrescent, the internode above the uppermost cataphyll often much elongated and up to 1 ft. long, prostrate or inclined, ending in a motile knee and sometimes rooting from it, followed above it by a succession of short sheathed internodes forming an erect leafy and flowering culm, which rarely rises over ½ ft. above the knee; innovation-buds extravaginal from the knee, growing out into runners or directly into secondary leafy culms. Leafy or flowering culms few- to 8-noded, with all their leaves normal foliage-leaves or (on secondary culms) the lowest 2 or 3 of them developed as cataphylls, usually all the internodes except the uppermost enclosed in the sheaths. Leaf-sheaths very tight, firm, terete, strongly striate, appressedly hairy between the nerves and with a dense transverse dorsal line of hairs at the junction with the blade; ligules obscure; blades broad-lanceolate, acutely acuminate, 2-4 in. by $\frac{2}{3}$ -1 in., rather firm and somewhat rigid, shortly contracted at the base, glabrous above, finely and appressedly pubescent below towards

the base, rarely higher up, at length often quite glabrous, midrib very slender, somewhat prominent below downwards, obscure above, lateral nerves close, 60-70 per inch; epidermal cells small with rather stout straight more or less pitted lateral walls. Inflorescence shortly exserted, from less than 1 to almost 3 in. long; lower primary branchlets $2\frac{1}{2}$ —4 lin. long (excluding the spikelets), seldom longer, rarely with more than 3 perfect spikelets, upper reduced to 2-nate or solitary spikelets; axes filiform, more or less angular, finely pubescent or scaberulous; pedicels very unequal, the longest up to 3 lin, long. Spikelets oblong to lanceolate-oblong, 3-3\frac{1}{4} lin. long; the glumes and the lower floret more or less purplish. Lower glume from slightly over 1 to 1½ lin. long, 5-nerved; upper 2 lin. long, 7-nerved. Lower floret slightly shorter than the upper, 3: valve obliquely lanceolate-oblong in profile, subacuminate. Upper floret: valve whitish or very faintly suffused with purple, lanceolate in profile, bluntly rostrate-acuminate, glabrous except for the marginal cilia and the silky basal beard, the hairs of which are about $\frac{1}{2}$ lin. long. Anthers 1¹/₄ lin. long.—Pilger in Engl. Pflanzenwelt Afr. ii. 143.

Lower Guinea. French Congo: Lower Ogowe region; in forest near Njole, Thollon, 765!

2. M. Aspidistrula, Stapf in Hook. Ic. Pl. sub t. 3070 (partly). The whole plant $\frac{1}{2}$ to almost 2 ft. high; innovations extravaginal, rooting from the base, 1-7 in. long, with 3-4 cataphylls, the lowest of them very short, rounded, the second 1-1 in, long, loosely sheathing, the following separated by an internode ultimately up to over in. long, all silky at the nodes, otherwise mostly appressedly hairy between the nerves and ciliate along the margins or ciliate only or quite glabrous, quite bladeless, the uppermost 1 to over 6 in. long; the innovations growing out either directly into an erect or suberect leafy flowering culm or by the elongation of the first internode above the uppermost cataphyll into an inclined or arched runner-like or subprostrate base, sometimes over 1 ft. long, frequently rooting from its terminal node and throwing up from it an erect leafy culm orby the formation of extravaginal buds—a scanty fascicle of leafy culms; these secondary culms sheathed at the base with 2 or 3 cataphylls and reduced in size, but otherwise repeating the characters of the primary. Perfect leaves 1-3; sheaths tight, firm, appressedly or loosely pubescent or glabrous between the prominent nerves, always silky-pubescent at the nodes and with a ciliate dorsal transverse rim at the junction with the blade; ligules a transverse firm ciliolate rim; blades lanceolate, subsymmetrical or somewhat oblique, gradually tapering from the middle or slightly below it towards both ends, 4 to almost 12 in. by 1-2 in., moderately firm, glabrous above, finely and appressedly pubescent underneath, midrib slender, prominent below, lateral nerves 35-50 per inch. Inflorescence long-exserted, 3-9 in. long; lower primary branches





1-3 in. apart and 1-3 in. long, with up to 6 spikelets, or if more (long branches) then usually some of them arrested; axes filiform, angular, minutely puberulous or pubescent, or, at the nodes, almost villosu lous; pedicels very unequal, the longest up to 2, or the terminal up to over 3 lin. long, scaberulous to puberulous, tips sometimes discoid. Spikelets 3 to almost 4 lin. long, very like those of *M. barbinodis*, if not occasionally more slender and much paler. Lower glume often 7-nerved. Fertile valve sometimes pubescent up to beyond the middle.

Upper Guinea. Cameroons: in forests near Bipinde, Zenker, 1834! 2144! 3193!

Lower Guinea. Gaboon: Sierra del Crystal, Mann, 1646!

Whilst the specific identity of the specimens quoted above is fairly clear, that of the following might at the first glance be thought doubtful owing to the striking differences in the shape of the leaf-blades. A close examination, however, especially also of the anatomical characters of the epidermis of the leaves, shows so much agreement that it is more probable that these variations are only of the fluctuation type, if not due to conditions of illumination or some such factor. They may be described thus:—

Forma latus, Štapf. Leaf-blades conspicuously oblique, elliptic-oblong, 3–5 in. by $1-1\frac{3}{4}$ in., very finely pubescent below, soon becoming glabrous, rather

firm, prominently nerved; inflorescence about 3 in. long.

Upper Guinea. Cameroons: in forests near Bipinde, Zenker, 4730!

Forma angustus, Stapf. Leaf-blades linear-lanceolate, 4-10 in. by $\frac{1}{2}-1\frac{1}{2}$ in., softly pubescent below, thin, finely nerved; inflorescence 4-7 in. long, very slender.

Upper Guinea. Cameroons; in forests near Yaunde, Zenker, 1523! in forest near Efulen (south of Bipinde), Bates, 251!

3. M. convallarioides, Stapf in Hook. Ic. Pl. t. 3070. Culms in scanty fascicles, about 1 ft. high, ascending from a geniculate base and sometimes rooting from the lower nodes, sheathed at the base by about 3 cataphylls, the lowest very short, the others 3-7 in. long, striate, glabrous except at the pubescent nodes, rather thin and early breaking up. Perfect leaves 2 or 3; sheaths tight, terete, closely striate, pubescent to almost tomentose at the nodes, ciliate along the outer margin upwards, with a densely ciliate dorsal transverse rim at the junction with the blade, otherwise glabrous: ligules a ciliolate rim; blades lanceolate, acutely acuminate, long and more or less asymmetrically attenuated at the base, 6-8 in. by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., papery, with some scattered glistening hairs springing from minute tubercles on the upper side, otherwise quite glabrous; lateral nerves about 40 per inch, very slender. Inflorescence more or less exserted, 12-21 in. long, very scanty; primary branches more or less reduced to fascicles of 4-2 spikelets or the latter solitary upwards; common axis very slender, angular, minutely puberulous; pedicels filiform, the lateral $\frac{3}{4}$ -1 lin., the terminal (of a branchlet) up to 3 lin. long, scaberulous. Spikelets broadly oblong, $3\frac{1}{2}$ – $3\frac{3}{4}$ lin. long, pale. Glumes broadly ovate, shortly apiculate or subacute, the

N.S

lower $1\frac{1}{4}-1\frac{1}{2}$ lin. long, 5-nerved, the upper $1\frac{3}{4}-2$ lin. long, 7-9-nerved. Lower floret: valve obliquely and broadly oblong in profile, shortly and acutely acuminate, $3\frac{1}{4}-3\frac{1}{2}$ lin. long, thinly chartaceous. Upper floret: valve oblong-lanceolate in profile, subulate-acuminate, with the acumen slightly incurved, glabrous and smooth except at the minutely pubescent or villosulous base and the finely villosulous margins of the beak. Anthers 2 lin. long. Stigmas exserted subterminally, pale, $\frac{1}{2}$ lin. long.

Lower Guinea. French Gaboon: in mountain forests by the Como River, Bates, 481!

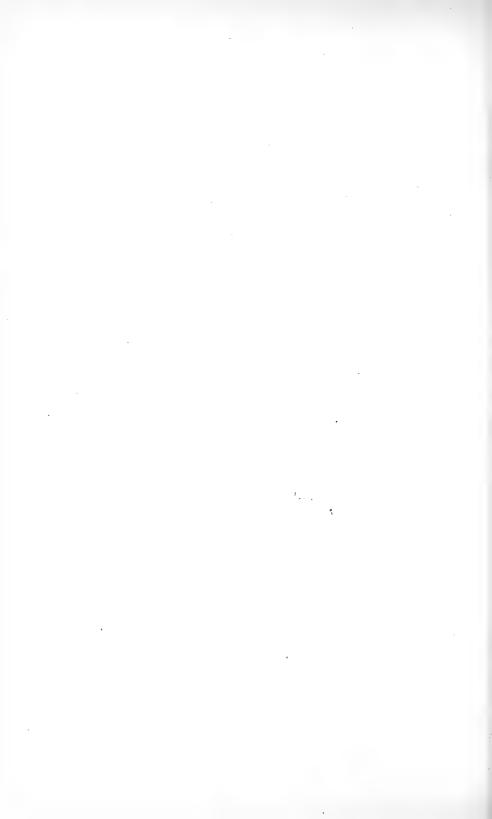
4. M. glaber, Stapf. Quite glabrous except at the base of the lowest cataphylls. Culms up to over 2 lin. in diam., striate, herbaceous, branching by means of extravaginal buds which break through the back of the base of the sheath of the lowest perfect foliage leaf, are covered with about 3 cataphylls, root from the basal nodes and grow out into secondary more or less erect leafy flowering culms; lowest cataphyll very short, rounded, second about 1 in. long, wide, like the preceding appressedly hairy at the base, otherwise glabrous, all distinctly striate. Perfect foliage leaves 1-4 with each culm; sheaths tight, striate, quite glabrous between the ribs, along the margins, and on the dorsal rim at the junction with the blade; ligules a subcoriaceous glabrous rim; blades obliquely broad-lanceolate, sometimes subfalcate, tapering from the lowest third or quarter upwards, rapidly contracted towards the almost petioloid base, about 9 in. by 2-3 in., rather firm, quite glabrous. midrib prominent below, lateral nerves 30-50 per inch; epidermal cells slightly wider than long, otherwise almost as in M. Aspidistrula. Inflorescence at length long- (by up to 4 in.) exserted, about 7-8 in. long; lower and intermediate primary branches 12-1 in. apart, up to 4 in. long, with numerous partly arrested spikelets; axes filiform. the primary somewhat stout, all very angular and very finely scaberulous; pedicels very unequal, up to 2 lin. or the terminal up to 4 lin. long, scaberulous, tips obscurely discoid. Spikelets 33-4 lin. long, very like those of M. Aspiaistrula, whitish.—M. Aspidistrula, Stapf in Hook. Ic. Pl. sub t. 3070 (partly).

Upper Guinea. Cameroons: in forests of the Bipinde district, Zenker, 4249! 4757!

59. PSEUDECHINOLÆNA, Stapf.

Spikelets obliquely ovoid, laterally compressed and mostly conspicuously gaping, falling entire from the pedicels, 2-nate or more often subsolitary (the secondary of the pair more or less arrested) or solitary, secund on the flat or subtriquetrous slender rhachis of spiciform racemosely arranged racemes; lower floret σ or barren; upper floret shorter than the lower, Σ . Glumes herbaceous, about





equally long and almost as long as the spikelet, or the lower distinctly shorter, heteromorphous; lower more or less flat, 3-nerved, always smooth or almost so, upper boat-shaped, gibbous downwards, 7-nerved, with longitudinal rows of more or less transparent spots ("glands") between the nerves and with or without shorter or longer stout hooked hairs or bristles from the centre of the spots. Lower floret as long as the spikelet: valve oblong-lanceolate with a minutely truncate tip, laterally compressed but rounded on the back, chartaceous, with membranous margins and a delicate hyaline area at the base, smooth; valvule almost as long as the valve, more or less convolute, faintly 2-nerved. Upper floret: valve broadlancedlate to oblong, subacute, very convex on the back, chartaceous, faintly 5-nerved; valvule similar to the valve in texture, tightly clasped by it when mature. Lodicules 2, cuneate. Stamens 3. Styles free at the base, capillary; stigmata plumose, subterminally exserted. Grain oblong in face-view, semi-obovate in profile, back very convex; scutellum elliptic, almost half the length of the grain; hilum subbasal, punctiform.—Annual, with very slender culms with a prostrate rooting base; leaf-blades lanceolate, soft; spikelets very irregularly armed or quite unarmed.

Species 1, in the tropics of both hemispheres.

Echinolena, under which this species was originally described, and to which it has been referred back again by Hitchcock and A. Chase (see below), is an exclusively American genus which differs from Pseudechinolena in many respects, as in its densely packed spikes, the many-nerved lower glume, the "eglandular" always unarmed upper glume, the uniformly papery 5-nerved lower valve which is accompanied by a sharply 2-keeled flat valvule, the basally appendaged fertile valve and the acutely aurieled or toothed flaps of its valvule, and finally the flatter grain which is marked with a panduriform line on the face extending through its full length and possesses a slender linear hilum.

(HIB.K.) 1. P. polystachya, Stapf. Rising to more than 1 ft. above the ground, the prostrate portion often up to a foot long with numerous short or long branches, growing into secondary culms, their bases often finely filiform, stronger upwards, all many-noded and rooting from the nodes near the ground; erect or ascending portion above the last branch 5-8-noded with as many perfect leaves; internodes exserted, terete, glabrous. Leaf-sheaths tight, terete, strongly striate, more or less appressedly hairy and ciliate along the margin or only ciliate; ligules thin, membranous, rounded or truncate, ciliolate, under 1 lin. long; blades lanceolate from a shortly contracted or rounded and usually slightly oblique base, acutely acuminate, from less than ½ in. (lowest) to up to over 2½ in. by 2-6 lin., dark green, glabrous, with scattered or very fine stiff hairs above. finely and appressedly pubescent underneath, midrib very fine, whitish or straw-coloured; lateral nerves fine, numerous, crowded. Inflorescence up to over 6 in. long, with up to 6 or even 8 racemes. mostly much shorter and with fewer racemes, occasionally reduced

to a solitary raceme; common axis subterete, channelled at least towards the insertion of the racemes, almost smooth, glabrous, 1/4 lin. in diam.; racemes appressed to the common axis or obliquely spreading, the lowest up to $1\frac{1}{2}$ in. long, sometimes quite short; rhachis filiform, triquetrous, not much over $\frac{1}{10}$ lin. wide, minutely puberulous; internodes of very unequal length, not rarely up to 5 lin. long; pedicels filiform, angular, pruinosely scaberulous, lateral up to 1 lin. long, often much shorter. Spikelets frequently very unequally developed, the lower of each raceme or the lower (secondary) of each pair often reduced in a varying degree; if perfect about 2 lin long. Glumes dull or brownish-green; lower oblong- to ovate-lanceolate, acuminate, as long as the spikelet or shorter (rarely by more than a quarter), glabrous or sparingly and very minutely scaberulous, nerves stout; upper semi-ovate in profile, acute with the tip laterally compressed, armature very variable in the same raceme, from short asperities to sharply pointed hairs bent at a right angle near the base then appressed and directed forwards or short or long (to over \frac{1}{2} lin.) cylindric or stoutly subulate protuberances bearing terminally at a right angle a fine very sharp bristle pointing mostly forwards; outermost lateral nerves marginal. Lower floret: valve pale, greenish only at the tip, very delicately scaberulous, hyaline basal area oblong, ½ lin. long, membranous margins rather wide upwards. Upper floret slightly over 1 lin. long, straw-coloured, smooth, shining. Anthers about \(\frac{7}{8} \) lin. long. Grain \(\frac{4}{5}\) lin. by \(\frac{1}{3}\) lin., pale.— Echinolæna polystachya, H. B. & K. Nov. Gen. et Sp. i. 119, vii. t. 679; Kunth, Enum. i. 172; Suppl. 127; Hitchcock, Mex. Grass. in Contr. U.S. Nat. Herb. xvii. 223; A. Chase in Proc. Biol. Soc. Wash. xxiv. 118. E. Trinii, Moritzi, Syst. Verz. Zoll. 102. Lappago aliena, Spreng. Neue Entdeck. iii. 15. Panicum uncinatum, Raddi, Agrost. Bras. 41; Trin. Pan. Gen. 240, and Gram. Ic. t. 216; Kunth, Enum. i. 172; Steud. Syn. Pl. Glum. i. 60; Franch. Contr. Fl. Congo Franç. 38; Hook. f. Fl. Brit. Ind. vii. 58, and in Trim. Handb. Fl. Ceyl. v. 160; Rendle in Cat. Afr. Pl. Welw. ii. 184; Pilg. in Schlechter, W. Afr. Kautschuk-Exped. 268; Cheval. Sudania, 185; Eyles in Trans. Roy. Soc. S. Afr. v. 301. P. glandulosum, Nees ex Trin. Gram. Pan. 174, and Agrost. Bras. 128. P. nemorosum, B, Trin. l.c. P. heteranthum, Link, Hort. Berol. i. 212; Kunth, I.c. 92. P. echinatum, Willd. ex Doell in Mart. Fl. Bras. ii. ii. 193. P. polystachyum, K. Schum, in Engl. Pfl. Ost-Afr. C. 103, not of others.

Upper Guinea. French Guinea: Fouta Jallon; between Dalaba and Diaguissa, 3600–4100 ft., Chevalier, 18570! Gold Coast: Aburi, Johnson, 832! Southern Nigeria: Aboh, Barter, 1354! Oban, Talbot, 851! Cameroons; Bigundi, Schlechter, 12419! Batanga, Bates, 171! Efulen, in forest, Bates, 207! Island of S. Thomé: Macambrara; Santa Maria, 4100–4250 ft., Moller, 141!

North Central. Upper Oubangui River: between Nana and Fort Sibut Chevalier, 10722!





Nile Land. Uganda: in dense woods near Mau, 7000 ft., Scott Elliot, 6888! in banana plantations near Kasamagas, 5300 ft., Scott Elliot, 7593! Kirerema

Forest, Dummer, 311! 424!

Lower Guinea. Belgian Congo: Stanley Pool District; Kunzulu, Vanderyst, 5192! Kwango District; between Kikwit and Atene, Vanderyst, 3252! Angola: Cazengo; on the banks of small streams in dense forests near Granja San Luiz, Pearson, 2334! Golungo Alto; in woody places near Cungulungula, Welwitsch, 7202! Pungo Andongo, Welvitsch, 2878!

Mozambique Distr. Gazaland: Chipete Forest, 3800 ft., Swynnerton, 408!
Chirinda, 3700–4000 ft., Swynnerton, 408!

60. **ERIOCHLOA**, H. B. & K.; Benth. et Hook. f. Gen. Pl. iii. 1099.

Spikelets ovate-lanceolate to oblong, acute or acuminate, sometimes finely and shortly aristulate, slightly compressed from the back, falling entire from the pedicels, 2-nate or solitary, secund and adaxial on the triquetrous rhachis of more or less spiciform simple or compound racemosely arranged racemes; lower floret or barren, upper floret \(\). Glumes very unequal; the lower reduced to a minute cupular rim clasping the callously thickened bead-like lowest internode of the spikelet, upper corresponding in outline and size to the spikelet, sometimes shortly aristulate, membranous, faintly 5-nerved, the submarginal nerves sometimes obscure. Lower floret: valve very like the upper glume, if not slightly shorter; valvule subequal to the valve, 2-keeled or reduced or, like the lodicules and flower, quite suppressed. Upper floret: valve chartaceous to almost crustaceous, glabrous or very minutely puberulous at the apex, faintly 5-nerved, with a fine barbellate mucro of varying length; valvule equal to the valve, 2-keeled with moderately narrow flaps. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted near the tips of the spikelets. Grain enclosed in its floret and the tightly appressed lower floret and upper glume, dorsally compressed; scutellum rather exceeding the middle of the grain; hilum subbasal, punctiform.—Perennial or annual. Leaf-blades more or less flat; ligules reduced to a ciliate rim. Racemes peduncled or the upper subsessile, racemosely arranged in a narrow panicle.

Species about 25, in the warm parts of both hemispheres.

Axes of the panicle not villous.

Lower floret reduced to its valve; mostly annual.

Spikelets oblong, acute, not aristulate, 1½ lin. long ... 1. E. ramosa.

Spikelets ovate-lanceolate, finely aristulate-acuminate,

... 2. E. acrotricha up to 2 lin. long

Lower floret 3 with a well-developed 2-keeled valvule; perennial with a stout rhizome; the innovations

with firm cataphylls 3. E. borumensis.

Axes of the panicle densely villous; lower floret & ... 4. E. Macclounii.

1. E. ramosa, O. Kuntze, Rev. Gen. Pl. ii. 775. Annual (sometimes = becoming perennial?), tufted, from less than 1 ft. to over 2 ft. high. FL. TROP. AFR. VOL. IX,-PT. 3 2 K

Culms geniculately ascending or erect, moderately slender to rather stout, 4-6- (rarely more-) noded, branched from the lower and frequently also from the intermediate nodes, glabrous. Leafsheaths often somewhat loose, subherbaceous, finely striate, smooth, quite glabrous except at the usually delicately pubescent nodes, very rarely with a few minute hairs; ligules reduced to a line of cilia; blades linear, from 2-6 (rarely more) in. by 2-4 (rarely 5) lin., slightly succulent and rigid, quite glabrous, very smooth, midrib very slender, lateral nerves very fine, numerous and close, the primary usually hardly differentiated. Panicle flaccid, narrow or more or less open, but always secund, 3-6 in. long (rarely under 3 in.), of usually numerous subcrect or obliquely spreading flexuous or drooping distant racemes; common axis slender, subterete, channelled, striate, smooth and glabrous except at the scaberulous edges of the channel; racemes peduncled (the lowest with the peduncles up to over 1 in. long), or the uppermost subsessile, usually simple or in robust specimens more or less compound downwards with short secondary racemes, $1\frac{1}{2}-\frac{1}{2}$ in. long; rhachis flat on the back $\frac{3}{20}$ $\frac{1}{4}$ lin. wide, with a slender acute projecting midrib on the face (hence more or less triquetrous in cross section), scaberulous all over; pedicels 2-nate or solitary, the longer of a pair up to $\frac{3}{4}$ or almost 1 lin. long, slender, finely scaberulous, occasionally with a very few fine hairs from the upper part, tips subdiscoid. Spikelets 2-seriate, laterally contiguous, oblong, acute, mostly 1½ lin. long, rarely less, rarely longer, pale green; basal bead-like internode pale or one half blackish-purple, up to \(\frac{1}{6}\) lin. in diam. Lower glume reduced to a narrow membranous cupular rim around the bead; upper very faintly 5-nerved, finely and appressedly and often scantily silky, very acute or minutely mucronate, but without an awnlet. Lower floret reduced to an empty valve, equalling and very similar to the upper glume. Upper floret finely punctate, 1 lin. long; valve with a mucro $\frac{3}{20} - \frac{1}{5}$ lin. long. Anthers $\frac{1}{2}$ lin. long.—Hack. in Bull. Acad. Int. Bot. xvi. 19; Merrill in Philipp. Journ. Sc. i. Suppl. 348; Hitchcock in Contr. U.S. Nat. Herb. xii. 208. Eriochloa annulata. Kunth, Rév. Gram. i. 30, and Enum. i. 73; Duthie, List Grass. N.W. India, 2; Benth. Fl. Hongkong, 409; Hack. in Engl. Jahrb. vi. 233. E. annulata, var. nov., Rendle in Gregory, Great Rift Valley, 399. E. polystachya, Duthie, Ill. Indig. Fodd. Grass. Ind. t. 41; Fodd. Grass. N. Ind. 2; Hook. f. Fl. Brit Ind. vii. 20; Rendle in Journ. Linn. Soc. Bot. xxxvi. 320; not of H. B. & K. Milium ramosum, Retz. Obs. vi. 22; Roxb. Fl. Ind. i. 317; Griff. Not. iii. 15; Ic. Pl. Asiat. t. 139, f. 60. Agrostis ramosa, Poir. Encycl. Suppl. i. 257. Paspalum annulatum, Fluegge, Monogr. Pasp. 133; Trin. Sp. Gram. Ic. t. 133. Helopus lævis, Trin. ex Spreng. Neue Entdeck. ii. 49. H. annulatus, Steud. Syn. Glum. i. 99; not of Nees. Piptatherum annulatum, Presl, Rel. Haenk. i. 221; not of Raddi.

Nile Land. British East Africa: near Njemps, Lake Baringo, Gregory!



Confirmation of the Zear of the

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Mozambique Distr. German East Africa: Usambara; by streams near Dugu, *Holst*, 3207! Portuguese East Africa: by the Luabo River, *Kirk*! Beira, *Rogers*, 13114!

Common throughout tropical Asia; introduced into Ascension Island, St. Helena and Cuba.

E. ramosa and the following species (E. aerotricha) are very closely allied and might, on a wider conception of the species, be treated as subspecies of a polymorphic type which would also include an Australian form described by Bailey as E. decumbens, in Queensl. Agr. Journ. i. 234, and in Queensl. FI. 1815, and figured in his Cat. Queensl. Pl. fig. 584. E. ramosa as understood here appears to be remarkably uniform throughout Asia in respect to the size, shape and structure of the spikelets. Gregory's and one of Roger's specimens, quoted above have remarkably small spikelets (I lin. long) and practically glabrous nodes. Another piece, however, of Roger's no. 13114 has spikelets of the usual size.

2. E. acrotricha, Hack. ex Thell. in Viertelj. Naturforsch. Ges. Zürich, lii. 435; not in Denkschr. Akad. Wien. Math.-Nat. lxxviii. 399. Annual, tufted, ½ to over 2 ft. high. Culms geniculately ascending, slender to somewhat robust, rarely quite erect, few- to over 5-noded, branched from the lower or sometimes also from the middle nodes, glabrous or finely pubescent below the inflorescence. Leaf-sheaths rather loose, often thin, finely striate, quite glabrous or very finely pubescent at the nodes or also higher up or all over; ligules reduced to a line of cilia; blades linear from an equally wide or shortly and slightly contracted base, long-tapering to an acute point, from less than ½ to over 6 in. by 1½-4 lin., thin and flaccid to rather firm and subrigid, quite glabrous or more or less minutely hairy on one or both sides (particularly the lower), smooth or slightly rough upwards, midrib slender to very fine, lateral primary nerves 3-6 on each side, slender to very fine. Panicle narrow, flaccid, $1\frac{1}{2}$ -4, rarely up to 5 in. long, of few to up to 10 (rarely more) subcrect or obliquely spreading straight or flexuous distant racemes; common axis slender, subterete, channelled, striate to angular, finely ciliolate or scaberulous upwards along the edges of the channel, otherwise glabrous or delicately pubescent; racemes peduncled (the lower with the peduncles $\frac{1}{4}$ to up to over 1 in. long) or subsessile, $1\frac{1}{2} - \frac{1}{2}$ in. long, terminating with a spikelet; rhachis flat on the back, from less than $\frac{1}{4} - \frac{1}{2}$ lin. wide, with a slender acute projecting midrib on the face (hence more or less triquetrous in cross-section), scabrid or scaberulous, here and there also ciliate along the angles, otherwise finely pubescent or almost glabrous; pedicels 2-nate or solitary, all very short or the longer of a pair up to \(\frac{3}{4}\) and even 1 lin. long, slender, finely pubescent with few to many fine rigid hairs from below the subdiscoid tips, the hairs up to over 1 lin. long, forming suberect beards if numerous. Spikelets 2-seriate, laterally contiguous, ovatelanceolate, long and finely aristulate-acuminate, including the acumen 2 lin. long, pale green, more or less silky; basal bead-like internode pale or one half blackish-purple, up to \frac{1}{6} lin. in diam. Lower glume reduced to a narrow membranous cupular rim around the bead; upper 5-nerved, appressedly silky, awnlet up to \frac{1}{2} lin.

long. Lower floret reduced to a mucronulate valve slightly shorter than the upper glume and very similar to it. Upper floret finely punctate, up to $1\frac{1}{4}$ lin. long; valve with a mucro up to $\frac{3}{8}$ lin. long. Anthers $\frac{1}{3}$ lin. long. Grain elliptic in outline, over $\frac{e}{10}$ by $\frac{4}{10}$ lin., pale greenish.—*E. punctata*, Durand & Schinz, Consp. Fl. Afr. v. 739; Hack. in Bolet, Soc. Brot. v. 210; Cheval, Sudania, 163; not of Ham. E. punctata, var. acrotricha, Benth. ex K. Schum. in Engl. Pfl. Ost-Afr. C. 100. E. polystachya, Schweinf. in Bull. Herb: Boiss. ii. App. ii. 18; Durand & Schinz, I.c.; Rendle in Cat. Afr. Pl. Welw. ii. 166; not of H. B. & K. E. ramosa, Chiov. in Ann. Istit. Bot. Roma, vi. 165, vii. 62, and viii. 29, 293; not of O. Kuntze. E. nubica, Stapf ex Cheval. Sudania, 34. Helopus annulatus, A. Rich. Tent. Fl. Abyss. ii. 370; not of Kunth. H. acrotrichus, Steud. Syn. Glum. i. 100. H. nubicus, Steud. l.c. Panicum fatmense, Hochst. ms. ex Steud. l.c.

Upper Guinea. Senegal: near Richard-Toll, Roger, 17! Dakar, Chevalier, 2289! Island of St. Thomé: on the beach at S. Antonio, Quintas, 131! Rattray!

North Central. Northern Bagirmi: Abougher, Chevalier, 9622!

North Central. Northern Bagirmi: Abougher, Chevalier, 9622!
Nile Land. Nubia: Singat, Schweinfurth, 390! Sudan: Cordofan; Mount Arasch-Kool, Kotschy, 382! Upper Nile Province; Meshra el Zeraf, Broun, 1591! Eritrea: Massaua, Abd el Kader, Schweinfurth & Riva, 221! Dahlak Archipelago; in various islands, Terracciano, 417, 482! 2609; Pappi, 4477. Dambeita; Hotha Island, Terracciano, 2610. Samhar; Metscelt, Terracciano & Pappi, 2372. Amasen; Fort Baresa, Pappi, 3254; Sabarguma plain, Pappi, 3190; near Ailet, Pappi, 3477. Abyssinia: Tigre; Modat, along dried up river-beds, Schimper, 1748! Hamedo plain, 4500 ft., Schimper, 1003! Samen; in moist places near Bellaka, 6000 ft., Schimper, 6! 2241! in the valley of the River Web, Riva; on the banks of the River Dawa, Riva, 559. British East Africa: Makindu, Linton, 118!

Lower Guinea. Angola: Loanda; on the banks of ponds above Fortido

Lower Guinea. Angola: Loanda; on the banks of ponds above Fortido Conceicao, Welwitsch, 7344! round the artificial ponds of St. Luiz Gomez, Welwitsch, 7289! around ponds near Bemposta, Welwitsch, 7283! Museque von

Hunen, Gossweiler, 1592!

Mozambique Distr. Nyasaland: Elephant marsh on the River Shire, Kirk! Portuguese East Africa: Boruma, Menyharth, 1130!

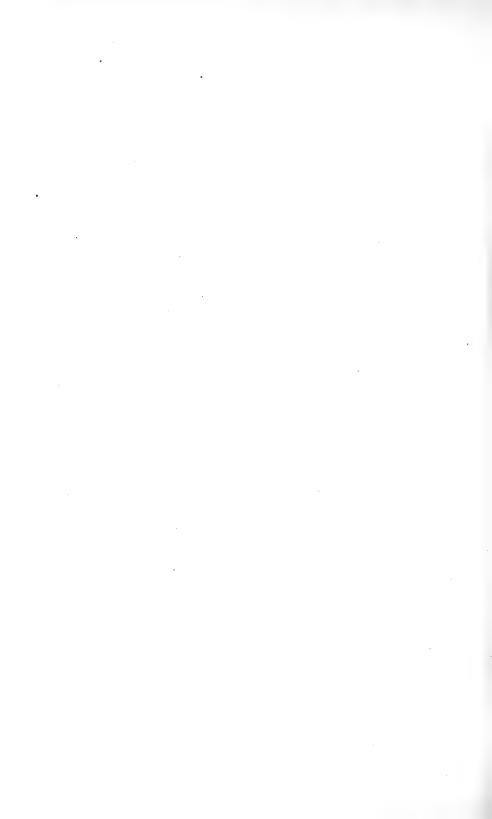
Also in Tropical Arabia and occasionally in India.

Welwitsch's specimens nos. 7283 and 7344 are said to be perennial (Cat. Afr. Pl. Welw. l.c.), but on the original tickets they are described as "O."

Helopus nubicus, Steud. (E. nubica) is supposed to differ by the pubescence of its leaves, "naked" pedicels (that is devoid of fine rigid hairs) and an aristulate upper glume and lower valve. As to the last character, there is no difference in the specimens quoted by Steudel as his originals, and as to the others, they do not seem to be sufficiently correlated with other structural peculiarities or geographical factors.

3. E. borumensis, Hack. in Bull. Herb. Boiss. 2me sér. i. 765. Perennial, up to over 3 ft. high, with a short stout rhizome emitting very stout roots and innovations which are intravaginal or at least closely appressed to the mother culm, conical when young, and covered with firm striate pubescent cataphylls. Culms erect or geniculate, sparingly branched below or simple, stout to very stout (3½ lin. in diam.), glabrous, 5-7-noded. Leaf-sheaths rather tight and firm, the upper shorter than the internodes, smooth, striate,





finely pubescent to tomentose at the nodes and sometimes, but less so, at the junction with the blade, otherwise glabrous or with fine sparingly scattered spreading hairs; ligules reduced to a densely ciliate rim; blades convolute in bud, linear from an almost equally wide base, tapering to a long acute point, up to over 8 in. by 3-4 lin., somewhat succulent and rigid, glabrous, smooth or very slightly rough upwards, nerves very numerous and close, the primary ones (5-6 on each side) hardly more prominent. Panicle oblong to linear, 4-10 in, long, of numerous subcrect or slightly spreading straight racemes; common axis terete, striate or angular, more or less channelled upwards, smooth below, scaberulous, puberulous or sometimes loosely pubescent above; racemes shortly peduncled or the upper almost sessile (the lowest peduncles rarely much exceeding in.), the lower up to 3 in, long and compound with secondary racemes up to 3 lin. long and bearing up to 6 or 7 spikelets, the others shorter to much shorter and more or less simple; rhachis triquetrous, $\frac{3}{20}$ $\frac{1}{4}$ lin. wide, scabrid along the edges, more or less scaberulous or almost smooth on the faces, of the secondary racemes wavy, much more slender and scaberulous all over; pedicels 2-nate or solitary towards the top of the raceme, unequal, the longer up to 1 lin. long, scaberulous, sometimes with a very few stiff hairs below the subdiscoid tips. Spikelets hardly appearing 2-seriate even where the raceme is simple, ovate-lanceolate, acuminate or aristulate-acuminate, $1\frac{1}{2}$ - $1\frac{3}{4}$ lin. long, pale green or faintly tinged with purple, slightly silky; basal bead-like internode more or less purple to almost black in the upper part, up to $\frac{1}{5}$ lin. in diam. Lower glume reduced to a narrow membranous cupular rim or developed as a minute nerveless scale clasping the base of the spikelet; upper 5-nerved, more or less (sometimes very sparingly) loosely silky, awnlet up to \frac{1}{3} lin. long. Lower floret 3: valve very similar to the upper glume if not slightly shorter and more hairy; valvule oblong, almost as long as the valve, 2-keeled, flaps narrow. Upper floret elliptic-oblong, obtuse, up to $1\frac{1}{4}$ lin. long, straw-coloured; valve shortly mucronate, mucro about $\frac{1}{7}-\frac{1}{8}$ lin. long. Anthers $\frac{3}{8}$ lin. long.

Mozambique Distr. Portuguese East Africa: Msalu River, *Allen*, 122! between Shupanga and Senna, *Kirk*! Boruma, *Menyharth*, 1114!

Menyhart's specimens from which Hackel described the species have spikelets which are destitute of the little awnlets present in the other specimens quoted above, and the lower glume is also more distinctly developed, but otherwise they are quite like them. A specimen collected by Holst at Masheua, Usambara (no. 3524), seems also to belong here. It has the same rhizome, innovations, culms, leaves and paniele, but the primary axis of the latter is pubescent to villosulous towards the nodes; the spikelets as in Menyhart's specimen are distinguished by the complete absence of an awnlet and the cuff-like development of the lower glume, whilst the bead-like basal internode is very small.

4. E. Macclounii, Stapf. Base unknown. Culms terete, rather slender upwards, tomentose below the inflorescence. Leaf-sheaths

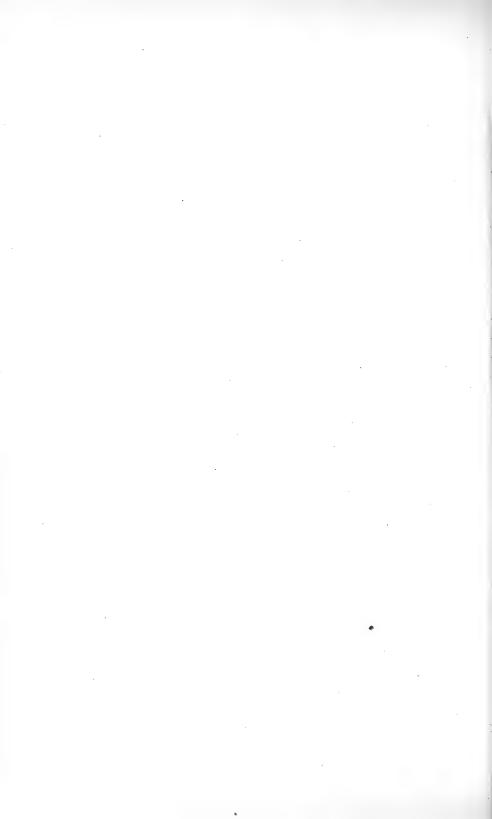
(upper only known) rather wide and loose, striate, very smooth and glabrous; ligules reduced to a ciliate rim; blades linear from a slightly wider base, long-tapering to a fine point, up to 6 in. by 5 lin., rather firm, yellowish-green, loosely and shortly hairy above, finely pubescent underneath, midrib slender, primary lateral nerves about 5 on each side, very slender, prominent underneath. Panicle narrowly oblong, subsecund, 5-6 in. long, of numerous compound alternately approximate and distant more or less flexuous racemes; common axis slender, densely greyish-villous; racemes peduncled (peduncles of the lowest up to over $\frac{1}{2}$ in, long) or the upper subsessile, simple only in the upper part, to over 2 in. long; secondary racemes mostly 3-2-spiculate and short, about $1\frac{1}{2}$ lin. long, only the lowest longer (occasionally up to 6 lin.); rhachis very slender, triquetrous, up to $\frac{1}{5}$ lin. wide, densely greyish- or yellowish-villous; secondary rhachises still finer; pedicels very unequal, the longer up to 1 lin. long, very slender with subdiscoid tips, villous with some longer hairs upwards. Spikelets ovate-lanceolate, long aristulate-acuminate, 2 lin. long, pale, silky; callous internode about \frac{1}{5} lin. wide. Lower glume reduced to a narrow membranous cupular rim, mostly purple; upper faintly 5-nerved, more or less appressedly silky, with an awnlet up to 1 lin. long. Lower floret &; valve very similar to the upper glume but slightly shorter, very acute but not aristulate; valvule oblong, almost as long as the valve, 2-keeled, flaps narrow. Upper floret elliptic-oblong, slightly over 1 lin. long, pale; valve with a mucro up to $\frac{2}{5}$ lin. long.

Mozambique Distr. Nyasaland: Nyika plateau Mwanemba, 7000 ft., McClounie, 8!

61. LEUCOPHRYS, Rendle in Cat. Afr. Pl. Welw. ii. 193.

Spikelets ovate-lanceolate, acuminate, dorsally slightly compressed, more or less stipitate, falling entire from the pedicels, solitary or 2-nate or fascicled, indistinctly or irregularly orientated with regard to the very slender subangular rhachis of the loose and racemosely arranged or much contracted and clustered racemes; lower floret of, upper floret &. Glumes as long as the spikelet or the lower shorter, separated by a distinct internode, whitish, delicately membranous or the upper firmer below the middle, softly hairy, the lower 1-5-, the upper 5-7-nerved. Lower floret equalling the upper glume: valve very similar to the upper glume, hairy; valvule equal to the valve or shorter, 2-keeled. Upper floret glabrous: valve smooth, at length crustaceous, subacute to obtuse, faintly 5-nerved; valvule equalling the valve and similar in substance, 2-keeled. Lodicules 2, cuneate, fleshy. Stamens 3. Styles distinct; stigmas plumose, exserted subterminally. Grain unknown.—Perennial or annual; blades linear, glaucous, drawn out into fine hardened and almost spinose points; ligule reduced to a fringe of minute hairs; panicles very narrow.





Species 2, in south-west Africa on both sides of the tropic of Capricorn.

Perennial with branched hard almost woody stems. Spikelets up to 4 lin. long, in loose appressed racemes $1\frac{1}{2} - \frac{1}{2}$ in.long; glumes of equal length, corresponding to the size of the spikelet; the upper glume with a transverse fringe and the lower valve with two separate tufts of hairs at the middle

... 1. L. mesocoma.

separate tufts of hairs at the middle Annual. Spikelets 1½ lin. long, in dense distant or approximate globose clusters or short false spikes; lower glume half the length of the upper, hairs of the upper glume and lower valve not gathered into fringes or

... 2. L. glomerata.

1. L. mesocoma, Rendle in Cat. Afr. Pl. Welw. ii. 194. Culms loosely tufted, up to 2 ft. high, branched from the base, repeatedly geniculate, ascending or spreading, up to many-noded, terete, glabrous, glaucous, waxy below the nodes. Leaves glaucous; sheaths rather loose, striate, thickened into a spongy ring at the nodes, often slipping from the stem and rolling in or breaking away, glabrous or the lowest finely pubescent; blades linear, long-tapering to a callous, sometimes spinescent and recurved point, flat or more often involute, up to over 3 in, long, often much shorter, 1-2½ lin. wide, glabrous or finely and softly pubescent, midrib and primary lateral nerves about equally slender, the latter about 4 on each side. Panicle very narrow, 3-6 in, long; common axis terete, flexuous, glabrous; racemes 5-6, erect, almost appressed, the lowest often remote, $1\frac{1}{2} - \frac{1}{2}$ in, long, simple or the longest compound at and bearing spikelets from the base; lower shorter than or as long as the internodes, upper longer or much longer than they; rhachis finely filiform, flexuous, glabrous or sparingly hairy or pubescent towards the nodes; pedicels finely filiform with discoid tips, loosely and shortly hairy to almost glabrous, scaberulous, the lateral up to $\frac{3}{4}$ lin. long, the terminal much longer. Spikelets including the stipe up to 4 lin. long, whitish; stipe $\frac{3}{4} - \frac{2}{5}$ lin. long. Lower glume subhyaline, white, silky-hairy at the base, glabrous upwards, ciliolate; upper rostrate or subulate-acuminate, 5-7-nerved, with a transverse fringe of long hairs at the middle, pubescent and firmer below it, glabrous above it except for the short cilia of the margin. Lower floret: valve similar to the upper glume, but less acuminate, longitudinally depressed and subhyaline with two distinct tufts of long hairs at the middle, almost glabrous below them, ciliolate above; valvule acute, keels scaberulous. Upper floret $1\frac{1}{2}$ lin. long, strawcoloured. Anthers 1 lin. long.—A. Chase in Proc. Biol. Soc. Wash. xxiv. 123. Panicum mesocomum, Nees, Fl. Afr. Austr. 34; Steud. Syn. Pl. Glum. i. 88; Durand & Schinz, Consp. Fl. Afr. v. 754; Stapf in Dyer, Fl. Cap. vii. 387.

Lower Guinea. Angola: Mossamedes; in gravelly soil of the River Bero, Welwitsch, 2295!

Also in Namaqualand as far south as the Orange River,

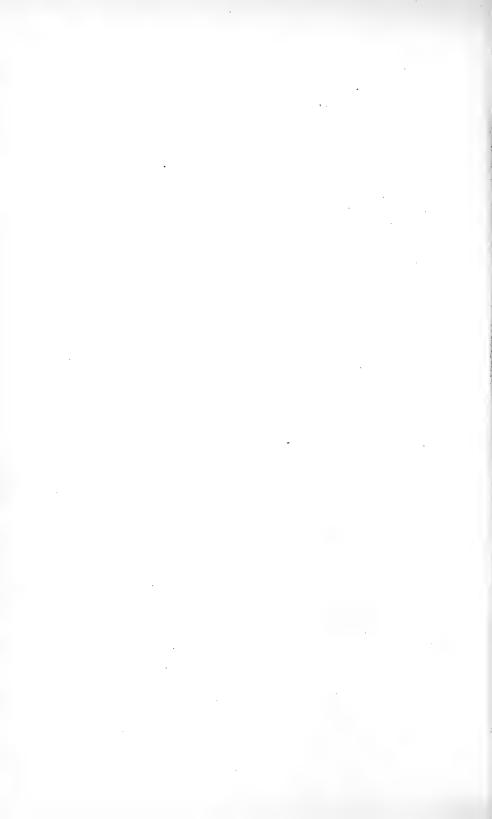
2. L. glomerata, Stapf. Annual, tufted, \(\frac{1}{4}\)-1 ft. high. Culms erect or ascending, sheathed all along or nearly so, about 4-noded, angular or deeply grooved, pubescent upwards. Leaves softly pubescent to greyish-villous all over, sheaths lax, thin, striate, the lower whitish, the upper subherbaceous; ligules a fringe of short hairs; blades linear-lanceolate from an equally broad base, longacuminate with fine callous recurved or curved spinous tips, up to 3½ in. by 3 lin., flat or folded, soft, somewhat wavy, midrib like the primary lateral nerves (3-4 on each side) very slender, the latter often obscure. Panicle much contracted, made up of sessile rarely peduncled distant or approximate dense globose clusters or short subsecund false spikes, crowded or loosely disposed on a slender filiform angular villosulous common axis 2-4 in, long, the clusters or spikes 3-4 lin. across, grevish-villous, representing more or less compound racemes; their rhachis filiform, subangular, up to $\frac{1}{10}$ lin. in diam., villosulous, internodes usually very short or up to I lin. long: secondary racemes very short, reduced to fascicles of up to 4 spikelets, or if more then some frequently arrested; pedicels fascicled, 2-nate or upwards solitary, slender, from very short to ½ lin. long, silkily hairy, hairs about ½ lin. long, tips subdiscoid. Spikelets obscurely stipitate, lanceolate-elliptic, acutely acuminate or acute, up to over $1\frac{1}{2}$ lin. long, pale or white or variegated with purple, hairy; rhachilla very frequently continued beyond the fertile floret as a short bristle. Glumes unequal; lower ovate, acute, half the length of the spikelet or almost so, delicately hyaline, 1-nerved, silkily hairy; upper only slightly firmer, corresponding in outline and size to the spikelet, with fine white hairs $(\frac{1}{2}, \frac{3}{4}]$ lin. long), finely but distinctly 5-nerved, nerves green or purplish or brown. Lower floret 3: valve very similar to the upper glume, rather widely involute upwards over the sides of the upper floret; valvule broadoblong, subacute or obtuse, subequal to the valve or shorter; anthers up to $\frac{3}{4}$ lin. long. Upper floret elliptic-oblong, subobtuse, $1-1\frac{1}{4}$ lin. long, whitish or pale brown; valve and valvule at length crustaceous, smooth; anthers about \(\frac{7}{8} \) lin. long.—Panicum glomeratum, Hack. in Verhandl. Bot. Ver. Brandenb. xxx. 141, and in Engl. Jahrb. xi. 398, and in Bull. Herb. Boiss. iv. App. iii. 14; Durand & Schinz, Consp. Fl. Afr. v. 750; Stapf in Dyer, Fl. Cap. vii. 393.

Lower Guinea. Angola: Mossamedes; Coroca River, Hopfner, 79! Southwest Africa: Hereroland; without precise locality, Schinz, 37! sandy banks of the Tsuachaub River near Hykamchab, Marloth, 1186! on granite at Kamkoichar near Salem, Gürich, 130!

Also in Great Namaland.

The affinity of this grass with *L. mesocoma* suggested itself only after the key to the genera of *Paniceæ* had been published (see this volume, p. 14). The diagnosis of *Leucophrys* given there will therefore have to be modified thus:— "Lowerglume about as long or less than half as long as the spikelet, whitish and subhyaline to delicately hyaline; upper glume and lower valve long hairy; racemes short, lax owing to lengthening of pedicels or much contracted and compound; spikelets without any very definite orientation as regards their rhachis.'





Although Leucophrys has been placed here near Brachiaria the affinity is not very evident. The orientation of the spikelets with regard to their rhachis is very vague, as is also the dorsiventrality of the rhachis. Apart from floral characters relied upon for the generic characters the two species referred here to Leucophrys have also this in common, that the tips of their blades are drawn out into a fine somewhat hard curved or hooked and almost spinous point. The continuation of the rhachilla of the spikelets of L. glomerata into a fine rigid subule of varying length is a remarkable feature, quite unusual in Paniceæ.

62. BRACHIARIA, Gris. in Ledeb. Fl. Ross. iv. 469.

Spikelets oblong to ovate- or elliptic-oblong, awnless, usually more or less flattened or slightly depressed, convex on the back, falling entire from the pedicels, 1-2-nate, more rarely in fascicles of 3 or more, secund and adaxial on the triquetrous or flat rhachis of moderately slender or stout mostly spiciform racemes; lower floret of or barren with a usually well-developed valvule, very rarely the latter suppressed. Glumes dissimilar and mostly very unequal in length, the lower being the shorter, upper resembling and more or less equalling the valve of the lower floret, 5-7- (very rarely 9)-nerved with the nerves evenly distributed. Lower floret: valve 5-, very rarely 7-nerved, the lateral nerves placed towards the margins and distant from the middle nerve; valvule usually only slightly shorter than the valve with well-developed inflexed flaps or the latter vanishing above the middle. Upper floret: valve oblong to elliptic in outline, emucronate, though sometimes contracted into a small projecting point, more or less crustaceous or subcoriaceous with firm margins, narrowly involute, faintly 5-nerved; valvule almost as long as the valve, 2-keeled, its sides tightly embraced by the valve all along, of the same texture as the latter. Lodicules 2, small, broadly cuneate. Stamens 3. Styles distinct; stigmas plumose, laterally exserted from the upper part of the spikelet. Grain tightly enclosed by the more or less hardened valve and valvule, broad oblong or elliptic, dorsally compressed, more or less flattened on both faces with broadly rounded sides; hilum subbasal, punctiform; embryo half to over three-quarters the length of the grain. —Perennial or annual; blades linear to lanceolate, usually flat; ligules reduced to a narrow ciliate or ciliolate rim; racemes usually subsessile and solitary on a common axis, sometimes bare at the base owing to the arrest of spikelets, rarely truly peduncled and panicled (B. powoides), simple or compound near the base, rarely to or beyond the middle; rhachis filiform, triquetrous or more or less flattened and herbaceous with a wavy or zig-zag midrib which projects as a mostly acute keel on the face; pedicels solitary or in pairs, alternately to the right and the left of the facial angle or the midrib, if solitary all short or very short, if paired, the primary slightly to very much longer; spikelets closely appressed, always 2-seriate in the plan, but frequently becoming 1-seriate by the dovetailing of the alternate spikelets of the closely approximate ranks, more or less contiguous

with their sides or imbricate forming dense spike-like racemes, or distant by almost their own length or more, glabrous or hairy.— Panicum & Brachiaria, Benth. et Hook. f. Gen. Pl. iii. 1102 (partly).

Species about 80, in the warm parts of both hemispheres, but mostly in Africa.

Lower glume usually very broad, obtuse, truncate or emarginate, 3 or more of the length of the spikelet with 9-11 or more firm parallel nerves or ribs, rarely narrower, subobtuse and only $\frac{2}{3}$ the length of the spikelet with 5 parallel nerves (4. *B. hians*); upper glume and lower valve reticulate from the base or cross-veined in the upper part only (7. B. falcifera and the 3 following species); lower floret δ , racemes simple, their rhachis slender, trigonous or flattened and herbaceous with a slender usually zig-zag midrib; spikelets solitary, all subsessile; perennial or annual

I. RETICULATÆ.

Lower glume half or less the length of the spikelet, finely nerved, rarely nerveless, nerves up to 11, but usually much less numerous, more or less inarched upwards and frequently anastomosing there; upper glume and lower valve without cross-veins or with cross-veins towards the tip only.

Rhachis more or less flat, herbaceous, sometimes ribbonlike with a slender raised midrib; spikelets solitary, subsessile or more rarely downwards 2-nate, dorsally somewhat flattened, in simple racemes or fascicled in compressed racemes (18. B. mutica frequently); perennial (except 21. B. distachyoides)

... II. MUTICÆ.

Rhachis more or less triquetrous, sometimes filiform.

Spikelets $1\frac{1}{2}$ - $3\frac{1}{2}$ lin. long, usually turgid.

All spikelets subsessile, their pedicels rarely exceeding $\frac{1}{2}$ lin.; lower floret δ ; perennial, or robust simple-stemmed annuals.

Spikelets solitary and 1-2-seriate or fascicled in 2-4-seriate racemes (25. B. obtusiflora), glabrous or at least not villous, 2-3½ lin. long; perennial or annual III. Brizanthæ

Spikelets typically solitary, 2-seriate, evenly silkily villous or with a silky transverse subapical fringe; racemes mostly simple, lower glume thinly membranous, pubescent; perennial

... IV. LACHNANTHÆ.

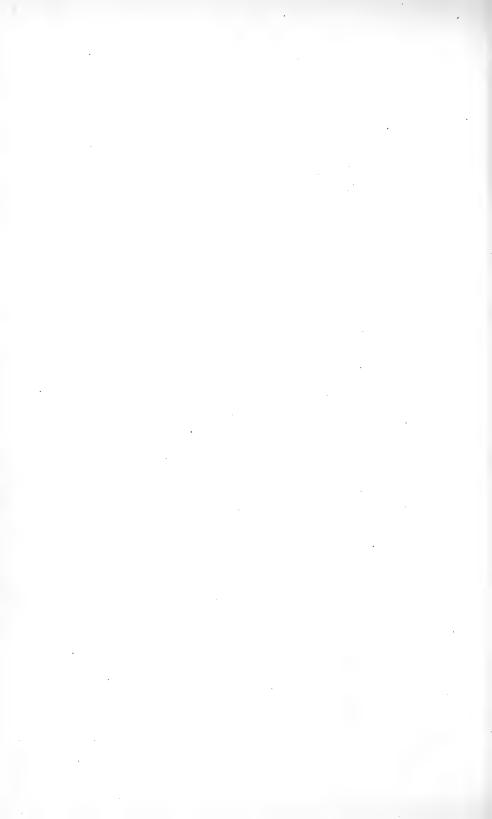
Spikelets (at least those near the base of the raceme) normally 2-nate with the primary on an elongated pedicel, rarely all solitary and shortly pedicelled (31. B. leucacrantha) or subsessile (38. B. pubifolia); lower floret barren (except in 30. B. arida); all annual (except 30. B. arida and possibly sometimes 39. B. glauca), usually short-branched grasses with slender culms

V. RAMOSÆ. 509

Spikelets from less than $1-1\frac{1}{2}$ lin, long on the very slender rhachis $(\frac{1}{10} - \frac{1}{5} \text{ lin.})$ of simple or more often compound racemes, somewhat flattened on the back, rarely much convex and turgid; lower glume small to very small, delicately 5-1-nerved or nerveless; annual (except 47. B. andongensis) VI. DISTICHO-

PHYLLÆ





I. RETICULATÆ

I. RETICULATÆ.	
Spikelets 3½ lin. long; lower glume conspicuously exceeding the remainder of the spikelet and broader than it, wrapped round its sides before flowering, perennial	1. B. obvoluta.
Spikelets less than 3½ lin. long (except sometimes in 2. B. dictyoneura) with the lower glume equal to or shorter than the remainder of the spikelet. *Spikelets hairy; perennial. Rhachis of racemes subtriquetrous, usually wavy, the flat back up to ½ lin. wide; lower valve with cross-veins from low down. Spikelets 2½-3½ lin. long; lower glume as long or almost as long as the spikelet, 11-nerved; rhachis of racemes minutely ciliolate or very sparingly ciliate	2. B. dictyoneura.
Spikelets 1\frac{3}{4}-2\frac{1}{2}\ lin. long; lower glume distinctly shorter than the spikelet, 9-5-nerved; rhachis of racemes loosely and irregularly ciliate or setulosely and densely ciliate (6. B. filifolia). Spikelets 2-2\frac{1}{4}\ lin. long, apparently 1-seriate (owing to dovetailing of the two ranks) on a very slender rhachis; lower glume 9-5-nerved. Lower glume \frac{4}{5}\ or more the length of the spikelet, as wide as the lower floret, 7-9-nerved \ldots.	3. B. Rautanenii.
Lower glume $\frac{2}{3}$ the length of the spikelet, much narrower than the lower floret, 5-nerved	4. B. hians.
Spikelets $1\frac{3}{4}$ –2 lin, long, distinctly 2-seriate on a more flattened rhachis, $\frac{3}{10}$ – $\frac{2}{5}$ lin, wide; lower glume 11–9-nerved. Blades flat, $1\frac{1}{2}$ – $2\frac{1}{2}$ lin, wide	5. B. viridula.
Blades filiform, subterete or tightly convolute, $\frac{1}{4}$ lin, in diam	6. B. filifolia.
Rhachis of racemes herbaceous, more or less ribbon- like with the setulously ciliate margins curving over the bases of the spikelets which are placed alternately to right and left of a slender zig-zag midrib, from \(\frac{1}{3}\)-1 lin. wide; lower glume 9-11- nerved, equalling \(\frac{2}{3}\)-\frac{4}{5} of the spikelet; lower valve with cross-veins in the upper third or tip only. Blades narrowly convolute or folded with a dorsally keeled midrib, 3-10 in. by 1-1\(\frac{1}{2}\) lin. (unfolded); culms erect, 3-4-noded, compactly convolute with intravaginal innovations; rhachis of racemes \(\frac{3}{4}\) lin. wide; spikelets \(1\frac{1}{2}\) lin. long	7. B. falcifera.
Blades flat, much broader with a slender midrib. Densely cæspitose; innovations intravaginal or if extravaginal then growing up close to the mother-culm; culms mostly erect or suberect, 2-4-noded.	
Spikelets $1\frac{1}{2}-1\frac{3}{4}$ lin. long on a usually copiously and long-setulose ciliate rhachis, $\frac{3}{4}-1$ lin. wide; racemes usually fulvous or rufous; culms 3-4- (rarely more-) noded; blades	A things of
from a few inches to over 1 ft. by 2-4 lin.	8. B. fulva.

Spikelets 11 lin. long on a more scantily and more shortly setulose-ciliate rhachis $\frac{1}{3}-\frac{1}{2}$ lin. wide; racemes greenish; culms 2noded; blades $1\frac{1}{2}$ -7 in. by $2-2\frac{1}{2}$ lin. 9. B. brevis. Loosely cæspitose; innovations extravaginal, sometimes growing into short creeping stolons; culms very slender, often geniculate and ascending, 5-6-noded; blades 3-4 in. by $2-2\frac{1}{2}$ lin., thin, bright green, glabrous or ciliate towards the base; rhachis of racemes $\frac{3}{8} - \frac{1}{9}$ lin. wide, rather copiously and longsetulosely ciliate; spikelets 14-11 lin. long ... 10. B soluta. 2.5-3.11 **Spikelets glabrous, reticulation of upper glume and lower valve rather raised and conspicuous; rhachis more or less herbaceous and flattened but very narrow, $\frac{1}{4} - \frac{1}{2}$ lin. wide; annual. Spikelets $2-2\frac{1}{2}$ lin. long; lower glume up to $\frac{3}{4}$ the length of the spikelet; anthers under 1 lin. long 11. B. stigmatisata.

Lower glume as long as the spikelet, 13-17-nerved 12. B. brevispicata. Lower glume half the length of the spikelet or less, 11-nerved ...

... 13. B. reticulata.

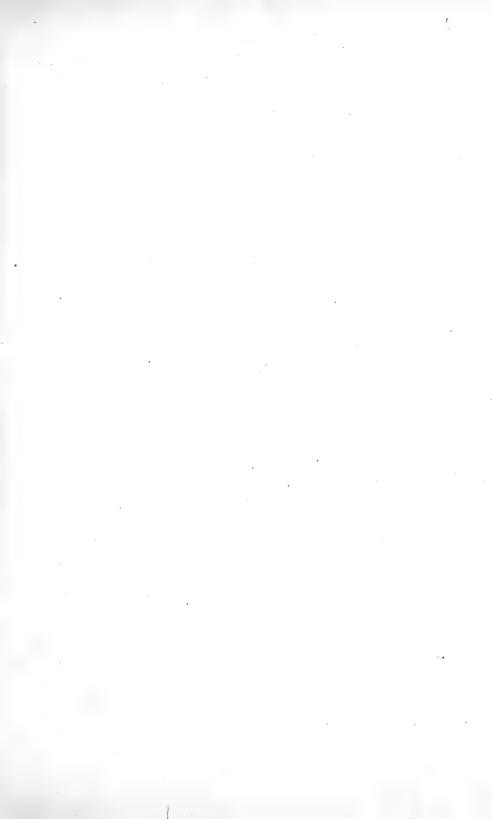
II. MUTICÆ.

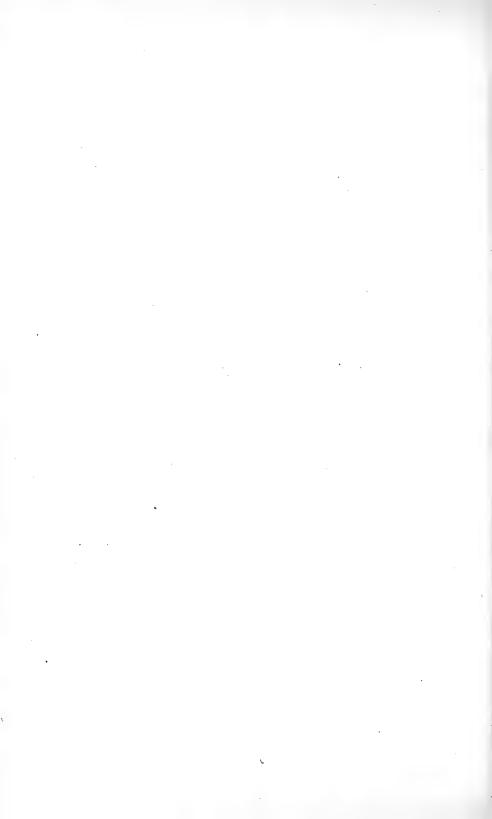
Spikelets under 2 lin. long.

Perennial. Rhachis of racemes 1-1½ lin. wide, ribbon-like; spikelets $2-2\frac{1}{4}$ lin. long, pubescent upwards. Glumes separated by a distinctly elongated internode, 1 lin. long, the lower shortly and acutely acuminate, 11-nerved; spikelets $2\frac{1}{4}-2\frac{1}{2}$ lin, long, drying brownish; blades up to 2 ft. by 1 in. [tata. ... 14. B. interstipi-Glumes separated by a short internode, the lower 2-denticulate, 8-10-nerved (without a middle nerve); spikelets $2-2\frac{1}{4}$ lin. long, pale; blades 4-7 in. by $\frac{1}{2}$ -1 in. 15. B. platytænia. Rhachis of racemes up to 1 lin. wide; spikelets $1\frac{1}{2}-2$, rarely 14, lin. long. Racemes mostly numerous $(5-\infty)$, lowest 2-6 in. long; rhachis eciliate; erect, rather tall grasses. Spikelets pubescent upwards, 2 lin. long; lower glume 9-11-nerved, nerve-ends anastomosing; ... 16. B. vittata. rhachis 1 lin. wide Spikelets glabrous; lower glume 3-5-nerved, nerveends free; rhachis about 2 lin. wide.

Spikelets 2¼ lin. long; racemes simple, solitary,
distant, up to 7 in a panicle of about 8 in. ... 17. B. latifolia. Spikelets $1\frac{1}{2}-1\frac{3}{4}$ lin. long; racemes up to ∞ in a panicle of 4-8 in., solitary or irregularly approximate, sometimes in false whorls, the lower frequently compound and then often ... 18. B. mutica. interrupted Racemes 2-6, lowest up to 2 in. long; rhachis ciliate, about ½ lin. wide; base of culms decumbent. Spikelets hairy, 2 lin. long; lower glume finely 9-nerved, nerve-ends inarching but hardly

anastomosing; blades 1½-3 in. by 4-5 lin. ... 19. B. decumbers.





P. M.

Spikelets glabrous, 1½ lin. long; lower glume finely 7-nerved; blades 3-4 in. by $1-1\frac{1}{2}$ lin. ... 20. B. rugulosa. Annual; spikelets 1 lin. long, glabrous; racemes slender, $1-1\frac{1}{2}$ in. long; rhachis narrow ($\frac{1}{2}$ lin.); lower glume 7-nerved; blades 2-5 in. by 1-2 lin. 21. B. distachyoides. III. BRIZANTHÆ. Inflorescence reduced to a solitary terminal 1-seriate raceme, very rarely augmented by a second raceme at some distance below the terminal; leaf-blades con-... 22. B. dura. volute, ½ lin. in diam., very wiry; perennial... Inflorescence of 2-8 racemes; leaf-blades flat, 3-8 lin. wide or tightly folded (1 lin.), not wiry; spikelets very turgid, 2 to over 3 lin. long, contracted at the base into a more or less distinct stipe; perennial or annual. Racemes usually 1-seriate, falcate, 2-6 in. long; leafblades 2-15 in. by 3-8 lin.; perennial, coarse grasses 23. B. brizantha. Racemes 2-4-seriate, more or less straight and subcrect; annual grasses with erect rather stout culms. Racemes 2-seriate; spikelets with a conspicuous globose stipe; upper glume 7-nerved, inner sidenerves prominent, scabrid, its sides like the upper half of the lower valve, minutely puberulous; leaf-blades tightly folded, up to 8 in. by over 1 lin. 24. B. callopus. Racemes irregularly 2-4-seriate, broad; spikelets with a short cylindric stipe, quite glabrous and smooth; upper glume and lower valve evenly 7-nerved; leaf-blades flat, 3-8 in. by 3-6 lin. ... 25. B. obtusiflora. IV. LACHNANTHÆ. Spikelets evenly silkily villous, not or very slightly turgid, $2-2\frac{1}{4}$ lin. long. Spikelets contracted at the base into a black stipe; lower glume half the length of the spikelet 26. B. nigropedata. Spikelets not contracted at the base into a stipe; lower glume from less than $\frac{1}{4}$ to $\frac{1}{3}$ the length of the spikelet 27. B. lachnantha. Spikelets with a transverse fringe of hairs below the glabrous tip, finely silky below the fringe or glabrescent in the centre, very turgid, $1\frac{1}{2}$ lin. long. Spikelets purplish-silky, the hairs of the fringe forming a more or less pointed coma which exceeds the tip. 28. B. serrata. Spikelets silvery-white, the hairs of the fringe short, ... 29. B. brachylopha hardly exceeding the tip correction ity. V. Ramosæ. Perennial (see also 39. B. glauca) ... 30. B. arida. Annual (except sometimes in 39. B. glauca); lower floret

Annual (except sometimes in 39. B. glauca); lower floret barren.

Spikelets more or less rostrate-acuminate or cuspidate, about 2 lin. long.

Spikelets ovate- or oblong-lanceolate, with small tufts of white hairs below the tips, otherwise glabrous or nearly so, whitish, loosely disposed ... 31. B. leucacrantha

... Chiran

Spikelets ovate to oblong-elliptic, more or less pubescent, particularly upwards, rarely glabrous,

32. B. xantholeuca. Spikelets obtuse to subacute or minutely apiculate. Spikelets 1½-2½ lin. long, mostly loosely to very loosely arranged (or more or less approximate in 33. B. ramosa), if paired the primary always borne on a distinctly elongated pedicel. Spikelets 1½ lin. long, pubescent or glabrous. Spikelets or pairs or clusters (secondary racemes) of spikelets approximate, evenly distant by less than their own length or rather remote downwards, glabrous or hairy; primary ... 33. B. ramosa. 5 4 2 pedicels up to 1 lin. long Spikelets or pairs of spikelets or secondary racemes very loosely scattered, distant by 5-8 lin., glabrous or hairy; primary pedicels 3-5 or even 10 lin. long ... 34. B. regularis. Jof ara Spikelets $1\frac{3}{4}-2\frac{1}{5}$ lin. long, quite glabrous. Racemes early deflexed; blades finely pubescent all over, their margins scaberulous 35. B. ovalis. Racemes subcrect or obliquely spreading; blades glabrous or with a few scattered marginal hairs near the base. Blades more or less rounded at the base, their margins scaberulous; spikelets or pairs of spikelets very loosely scattered, 4-10lin. distant ... 36. B. grossa. Blades cordate or obtusely auricled at the base, their margins markedly cartilaginous and spinulously serrulate; spikelets or pairs of spikelets more approximate, distant by ... 37. B. serrifolia. 2-3 lin. Spikelets $1\frac{1}{4}$ - $1\frac{1}{2}$ lin. long. Spikelets pubescent, obovate-oblong, apiculate, densely 1- to sub-2-seriate, all subsessile; all parts of the plant very pubescent ... 38. B. pubifolia. Spikelets glabrous, oblong, obtuse to acute. Valvule of lower floret with distinct inflexed flaps, epapillose; fruiting floret very finely transversely rugose or almost smooth; racemes suberect or oblique, loose to very loose;

Valvule almost without flaps, papillose at the base; fruiting floret sharply transversely rugose; racemes usually more or less inflexed after flowering, rather dark or loose to very loose; blades glabrous or with a few tubercle-

based hairs here and there 40. B. leersioides.

blades delicately pubescent to almost villous 39. B. glauca.

VI. DISTICHOPHYLLÆ.

Lower glume reduced to a minute nerveless hyaline scale.

Racemes simple, sessile, secund or subsecund on a
common axis 41. B. Isachne.

Racemes simple or compound, gathered in an open panicle 42. B. powoides.

33 Parison ...

· 34 is Pariser me!



Lower glume one-third to one-half the length of the spikelet, distinctly nerved, nerves 1-5.

Spikelets glabrous (see also 46. B. distichophylla). Racemes loose; spikelets (or pairs of spikelets) more or less distant, oblong, 1½ lin. long, the primary of a pair on a pedicel up to l_2^1 lin. long; lower glume 3-or sub-5-nerved; lower floret reduced to its valve 43. B. epaleata.

Racemes rather dense; spikelets mostly contiguous and subsessile, subovoid, very convex on the back, 1 lin. long; lower glume 1-3-nerved; lower floret barren but with a well-developed valvule

Ilatu. ... 44. B. semiundu-

Spikelets hairy (except sometimes in 46. B. distichophylla). Spikelets finely pubescent, rarely with the hairs collected into a small short fringe below the tip or quite glabrous (see 46. B. distichophylla), oblong.

> Spikelets solitary and subsessile or the lower paired, in dense or loose usually simple slender racemes, not gaping; lower florets barren ...

phyllo. ... 45. B. disticho-

Spikelets mostly in short racemules or clusters of 6-2, distant by more than their own length in straight or flexuous and sometimes nodding racemes which are compound up to or sometimes far beyond the middle, frequently gaping; lower floret & ...

... 46. B. kotschyana.

Perennial; spikelets solitary, 8-2 in very short racemes, turgid

... 47. B. andongensis.

Spikelets silky with a coma of long white soft hairs concealing the obtuse or subacute tip, obovoid, 3 to almost 1 in. long (excluding the coma) ... 48. B. comata.

1. B. obvoluta, Stapf. Perennial, up to over 1½ ft. high. Culms geniculately ascending, 4-noded, simple, angular below, sheathed high up. Leaves loosely and finely hairy all over; sheaths somewhat loose, the lower slipping off the culm and inrolling, 4-5 in. long, the upper up to over 6 in. long and ciliate upwards; ligules a narrow ciliate rim, blades linear from an equally wide base, tapering to a slender subcallous point, 4-8 in. by 2-3 lin., flat, firm, pale green, margins cartilaginous, sparingly and minutely spinulose, midrib very slender, primary lateral nerves about 4 on each side; uppermost blade subulate, 1 in. long. Inflorescence erect, secund, of 4 distant suberect or oblique robust secund spiciform racemes; common axis over 4 in. long, very slender, subterete, channelled, hairy towards the nodes and more finely so on the face. Racemes robust, up to 2 in. long, dense, 2-seriate, pale green, simple; rhachis triquetrous, \frac{1}{4} lin. wide, more or less wavy, pubescent on the back, scabrid and loosely white-ciliate along the angles; internodes about $1\frac{1}{4}$ lin. wide; pedicels solitary, very short. Spikelets subcontiguous or at least those of one rank incumbent on those of the other rank, broad-oblong, obtuse, 3½ lin. long, pale green. Glumes rather dissimilar, membranous; lower corresponding in outline and size to the spikelet, at first wrapped round the sides of the remainder of the spikelet and conspicuously exceeding it, then with the margins more or less involute, minutely emarginate, about 12-nerved, with the nerve-ends anastomosing and with some cross-veins below them, glabrous; upper glume broadly lanceolate-oblong, acute, not quite 3 lin. long, 7-nerved with very numerous cross-veins, scantily shortly and appressedly hairy all over. Lower floret \circlearrowleft , as long as the upper glume-valve membranous, 5-nerved, with the side-nerves on the hairy sides, the glabrous back traversed by numerous cross-veins; valvule almost as long as the valve, broad-oblong, subacute, keels finely marginate; anthers $1\frac{1}{2}$ lin. long. Upper floret $\mbox{\sc keels}$ finely marginate, cuspidate, $1\frac{3}{4}$ lin. long, whitish, dull; valve and valvule crustaceous, obscurely pitted.

Nile Land?? Mariakani, 6400 ft., Kässner, 451!

2. B. dictyoneura, Stapf. Perennial, 1½-3 ft. high, tufted apparently on a short rhizome; innovations extravaginal with moderately firm glabrous striate cataphylls. Culms slender or somewhat robust, geniculately ascending sometimes from a decumbent base, 4-9-noded, simple, the lower internodes compressed or, like the remainder, terete, glabrous, smooth. Leaf-sheaths somewhat loose or the uppermost (which are herbaceous) rather tight, the lower soon slipping off the culms and inrolled and thus almost resembling petioles, 12-4 in. long, striate, quite glabrous and smooth except along the ciliolate or pubescent upper margin and mouth, rarely with very fine scattered hairs rising from small pale tubercles; ligules a fringe of hairs; blades linear to linear-lanceolate, from an equally broad slightly rounded base, tapering to an acute point, of the basal leaves 2–10 in. by $2\frac{1}{2}$ –3 lin., flat, rigid, pale green, somewhat thick, quite glabrous or with some hairs at the base, rarely very loosely hairy all over, margins cartilaginous, more or less remotely and minutely spinulose, nerves fine, numerous, the primary lateral very obscurely differentiated below, midrib very slender; the blade of the uppermost leaf very nearly suppressed, subulate. Inflorescence at length exserted, secund, often arching, of 3-6 solitary oblique distant secund spiciform racemes; common axis very slender, 6-12 in. long, often produced above the uppermost raceme into a short barren point, semiterete, shallowly channelled or flattened adaxillarily, more or less pubescent or hirsute near the nodes and on the face, otherwise glabrous or nearly so, slightly scaberulous along the angles. Racemes very dense, 7-2 in. long, 2-seriate, the ranks closed up or divergent, sessile or subsessile, sometimes with 1-3 arrested spikelets at the base, straight or slightly arching; rhachis rather flattened, subtrigonous, very slightly wavy or straight, $\frac{1}{3}$ lin. wide, often dark purple, loosely setulose-ciliate and scaberulous along the angles, otherwise minutely puberulous or glabrous,

See Stent + Rattray, Proc. Rhod. Sci, Assn. 32:22, referred to B. hamidicola (Rendle) Schweich. Keir Bull. 1936: 297. 1936. syn. P. galae Chiov. fide Robyns

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internodes $\frac{3}{4}$ -1 lin. long; pedicels solitary, extremely short, setulosely bearded, setules $1\frac{1}{2}$ lin. long. Spikelets closely contiguous, broad-oblong, obtuse or subacute, up to over 2½ lin. long, greyishgreen with a usually deep-purple lower glume, silky hirsute. Glumes membranous, equalling the spikelet or the lower slightly shorter; the lower broad-oblong, clasping the lower floret, emarginate, glabrous, 11-nerved, with very few cross-veins upwards; upper similar to the lower if not broader, 9-7-nerved, with more numerous prominulous cross-veins, loosely hirsute, the hairs white, appressed, longer upwards and exceeding the tip of the glume. Lower floret of, almost as long as the glumes: valve similar to the glumes, 5-nerved, with numerous cross-veins, glabrous along the middle, otherwise hairy like the upper glume; valvule as long as the valve, broad-oblong, acute, keels hardened, more or less recurved upwards; anthers $1\frac{1}{2}$ lin. Upper floret \(\begin{aligned} \text{oblong}, \text{ oblong}, \text{ obtuse or minutely apiculate, constricted at the base, $1\frac{1}{2}$ lin. long, milk-white, more or less glossy; valve and valvule crustaceous, obscurely pitted.—Panicum dictyoneuron, Fig. & De Not. in Mem. Acc. Torin. ii. xiv. (1854), 329, t. 8, figs. 1-15. P. albovellereum, K. Schum, in Engl. Pfl. Ost-Afr., C. 101. P. humidicolum, Rendle in Journ. Linn. Soc. Bot. xi. 229.

Nile Land. Sudan: Cordofan, Figari. Southern Abyssinia: without precise locality, Stordy! British East Africa: Taita, Sacleux, 2571! Nairobi, Linton, 3! Dowson, 230! Kitui, Hildebrandt, 2663.

Mozambique Distr. German East Africa: Usambara; Bonda, Holst, 4015, and without precise locality, Hannington! Rhodesia: Salisbury; Makabusi Valley, Eyles, 588! Portuguese East Africa: open woods at Beira, Swynnerton, 1596 B!

(Hack.)
3. B. Rautanenii, Stapf. Perennial, up to 3 ft. high. Culms erect or geniculately ascending, terete or somewhat compressed, 4-5noded, simple, glabrous, internodes exserted. Leaves 8-9, rather crowded at the base; sheaths rather tight, compressed, smooth and glabrous, the basal rather short: ligules a ciliolate membranous rim; blades linear from an equally broad base, gradually tapering to an acute point, 2-4 in. by $2\frac{1}{2}$ lin., subconvolute, pale green, glabrous or somewhat hairy on the upper side near the base and pubescent at the junction with the sheath, rigid, pungent, margins cartilaginous, the outer remotely serrulate, the inner smooth, primary nerves about 4 on each side, inconspicuous. Inflorescence of 2 secund subserved spiciform racemes, the lower subsessile, reaching up to the base of the other; common axis very slender, flat, glabrous and smooth, purple-brown. Racemes simple, 2-seriate, about 2 in. long; rhachis very slender, flat, glabrous except at the pubescent base, purple-brown or blackish, internodes about 2 lin. long; pedicels solitary, more or less curved, up to $\frac{1}{2}$ lin. long, with swollen tips and stiff yellowish setules, about 3 lin. long. Spikelets contiguous, oblong, gaping, 2½ lin. long, yellowish-green. Glumes slightly unequal; lower oblong, obtuse, 2-24 lin. long, membranous, glabrous, 7-9-nerved with very few inconspicuous cross-veins near the apex; upper ovate-oblong, acuminate, acute or when flattened out sub-obtuse, membranous, rather firmer than the lower and as long as it or as long as the spikelet, hairy upwards, 7-nerved with numerous conspicuous cross-veins. Lower floret 3, $2\frac{1}{2}$ lin, long: valve elliptic, subacute to acute, concave, firmly membranous, loosely hairy on the sides upwards, 5-nerved, with cross-veins; valvule thin, elliptic, subacute, as long as the valve, keels narrowly winged; anthers $1\frac{3}{4}$ lin, long. Upper floret 3, over 2 lin, long, dorsally compressed, gaping at the top: valve oblong, mucronulate, 2 lin, long, thinly crustaceous, pale straw-coloured, glabrous, finely granular or subrugose; valvule of similar structure with rather narrow flaps; anthers as in the 3 floret. Stigmas pale, not exceeding the valvule nor laterally exserted (always?).—Panicum Rautanenii, Hack, in Bull, Herb, Boiss, 2me, sér, ii. (1902) 935.

Lower Guinea. Amboland: Ondonga, Rautanen!

4. B. hians, Stapf. Perennial, up to 2 ft. high. Culms erect, quite simple, very slender, terete or compressed below, 1-2-noded, with the uppermost node below the middle, glabrous and smooth except for a short hairy zone beneath the nodes: Leaf-sheaths (basal leaves not known) tight, terete, striate, smooth, more or less ciliolate towards the mouth, otherwise glabrous or nearly so, smooth; ligules a ciliolate rim; blades linear from an equally broad base, long-tapering to a fine point, up to over 3 in. by 2 lin., convolute, rigid, green, glabrous, margins cartilaginous, scabrid at least upwards, closely nerved, primary lateral nerves only slightly differentiated below. Inflorescence of 3-2 obliquely spreading secund spiciform subsessile racemes; common axis filiform, semiterete, hispidulous close to the nodes, otherwise finely pubescent on the face and slightly scaberulous on the angles, lower (or only) internode $1\frac{1}{4}-1\frac{1}{2}$ in. long, upper if present 1 in. long. Racemes simple, moderately dense, lower up to $1\frac{3}{4}$ in. long, upper $1\frac{1}{4}-\frac{3}{4}$ in. long, dull greenish, 1-seriate or sub-2-seriate; rhachis trigonous below, flattened upwards, very slightly wavy, up to $\frac{1}{6}$ lin. wide, minutely puberulous, angles scaberulous and irregularly ciliate, green, internodes 1-2 lin. long; pedicels solitary, extremely short, hispid. Spikelets distinctly discontiguous or subcontiguous if 1-seriate, oblong and subacute in back or front view, obliquely obovate and much gaping in side view, $2-2\frac{1}{4}$ lin. long, finely pubescent. Glumes more or less unequal; lower oblong to linear-oblong, narrower than the superposed lower floret, obtuse to subacute, about two-thirds the length of the spikelet, thinly membranous, delicately pubescent at least downwards, 5-nerved, nerves greenish; upper glume oblong, subobtuse, slightly shorter than or as long as the fertile spikelet, membranous, 5-nerved (sometimes with a faint additional submarginal nerve) with about 3 bars of cross-veins, finely and loosely pubescent all over with a few longer



5= B. Bovonei (Chiov) Robyns - file Rob. Paricum Bovonei Chiob. 1914 Brashiaria falcifera De Wild not Stapp Paricum folciferum De Wild not Trin hairs upwards. Lower floret \circlearrowleft , as long as the spikelet, gaping upwards: valve oblong, subacute, thinly membranous, depressed on the back, 5-nerved with the inner side-nerves widely distant and with some distant cross-veins, finely pubescent on the side; valvule as long as the valve, very acute, keels narrowly winged, wings firm, recurved upwards and together with the narrow glistening flaps laterally exposed; anthers over $1\frac{1}{2}$ lin. long. Upper floret \circlearrowleft , ellipticoblong in outline, minutely apiculate, much gaping when in flower, pale brown, slightly shorter than the spikelet; valve and valvule crustaceous, the former 5-nerved with a few cross-veins close to the tips.

South Central. Belgian Congo: Katanga, Homblé, 5!

5. **B.** viridula, Stapf. Perennial, up to over 1½ ft. high, compactly cæspitose with intra- and extravaginal innovations, coated with the persistent tough basal sheaths. Culms erect, quite simple, 2-noded, with the upper node usually far below the middle, terete or somewhat compressed downwards, glabrous and smooth. Leaves crowded at the base; sheaths tight, terete, striate, the lower more or less hirsute or glabrous except at the ciliate outer margin, the uppermost often quite glabrous; ligules a ciliolate rim; blades linear from an equally wide or slightly constricted base, tapering to a callous point, $1\frac{1}{2}$ -7 in. by $1\frac{1}{2}$ - $2\frac{1}{2}$ lin., flat, rather rigid, green, finely hirsute on both sides, and often bearded at the mouth, margins finely (sometimes obscurely) cartilaginous and remotely minutely spinulose or ciliate, nerves very slender or obscure, 3-5 primary lateral on each side distinguishable below only. Inflorescence erect, secund, of 4-2 oblique spreading secund spiciform racemes; common axis \(\frac{3}{4}\) to almost 3 in. long, filiform, semiterete and usually channelled below or flattened upwards, smooth or slightly rough and sparingly ciliate along the angles. Racemes simple, dense, straight, distinctly 2-seriate, 8-15 lin. long, greenish; rhachis somewhat wavy, rather flat on the green or dull purple back, triquetrous in cross section with narrowly winged lateral angles, $\frac{3}{8} - \frac{2}{5}$ lin. wide, minutely puberulous or scaberulous and loosely setulosely ciliate, internodes $\frac{3}{3}$ lin. long; pedicels solitary, extremely short, scabrid, setulose below the discoid tips. Spikelets imbricate in front view, laterally contiguous or nearly so. oblong to ovate-oblong, subacute or apiculate-acuminate, $1\frac{3}{4}$ lin. long, often slightly turgid, dull green except the lower glume which is sometimes purple, hairy. Glumes dissimilar; lower oblong to broad-elliptic-oblong, very obtuse or truncate and sometimes slightly emarginate, three-quarters to four-fifths the length of the spikelet, firmly membranous, 9-11-nerved, glabrous; upper nearly as long as the spikelet, subobtuse or minutely apiculate, thinner, 7-nerved with cross-veins from below, loosely hairy. Lower floret 3; as long as the spikelet: valve broad- to elliptic-oblong, subacute or apiculate, almost hyaline on the back, finely 5-nerved, loosely reticulate from the base, hairy on the sides; valvule oblong, acuminate, as long as or slightly longer than the valve and then shortly exserted from the spikelet, the keels very narrowly but firmly winged upwards, the wings revolute in the acumen which is slightly incurved (that is curved towards the valve) and often forms a short horn-shaped hood; anthers $\frac{4}{5}-1$ lin. long. Upper floret $\mbox{\normalfont{\normalfont\triangle}}$, oblong, subacute, white to yellowish, its apex sometimes loosely clasped by the hooded part of the valvule of the lower floret: valve and valvule crustaceous, smooth. Grain oblong, yellowish-green; scutellum longer than half the grain.

Nile Land. British East Africa: without precise locality, Dowson, 296!
South Central. Belgian Congo: Katanga; Elisabethville, Rogers, 10139!
Mozambique Distr. Nyasaland: Mount Malosa, 4000-6000 ft., Whyte!
Rhodesia: Salisbury, Nobbs, 674! Mrs. Craster, 19!

6. B. filifolia, Stapf. Perennial, compactly exspitose, 1-1½ ft. high; innovations intravaginal. Culms erect, quite simple, very slender, compressed at least downwards, 1-noded with the node far. below the middle, glabrous and smooth. Leaves crowded at the base; sheaths tight, striate, glabrous or more or less, but usually sparingly, hairy upwards, the basal long-persistent forming tough tight coats around the leafy and the flowering shoots; ligules a ciliolate rim; blades filiform, subterete, or laterally slightly compressed, narrowly channelled on the face or more deeply so (to beyond the middle) with one of the margins inflexed, pithy in the centre, subacute, 3-9 in. long, $\frac{1}{4}$ to almost $\frac{1}{2}$ lin. in diam., striate, more or less loosely hairy, particularly towards the base, hairs fine, white, springing from a minute tubercle. Inflorescence of 3-1 erect or oblique secund spiciform sessile racemes; common axis filiform, up to $\frac{1}{2}$ in. long, glabrous or sparingly hairy at the insertion of the racemes. Racemes dense, up to \(\frac{3}{4}\) in. long, alternate, 2-seriate, more or less purple; rhachis trigonous, straight or wavy, $\frac{3}{10} \frac{4}{10}$ lin. wide, puberulous, scaberulous and more or less loosely white ciliate along the lateral angles, usually dark purple on the back, internodes $\frac{3}{4}$ —1 lin. long; pedicels solitary, extremely short, angular, scabrid, setulose below the subdiscoid tips. Spikelets contiguous, oblong, about $1\frac{3}{4}$ lin. long, more or less tinged with purple, hairy. Glumes slightly unequal, quite or in part purple; lower oblong, subobtuse, with minutely denticulate tips, about three-quarters the length of the spikelet, membranous, strongly 9-nerved, sparingly hairy along the sides; upper slightly longer than or as long as the spikelet, broad-lanceolate or oblong, subobtuse, 5-6-nerved with few crossveins, loosely white hairy all over. Lower floret of or neuter: valve oblong, acute or subacuminate, as long as the spikelet, similar in texture and colouring to the upper glume, 5-nerved with the inner side-nerves distant from the midnerve and connected by crossveins, loosely hairy; valvule lanceolate-oblong, somewhat shorter





than the valve; anthers 1 lin. long if present. Upper floret \nothing , obtuse, white, its sides exposed upwards and vividly contrasting with the purple glumes and the lower valve, very smooth, shining; valve and valvules thinly crustaceous; anthers 1 lin. long.

- Lower Guinea. Angola: Country of the Ganguellas and Ambuellas, Gossweiler, 2001!

Mozambique Distr. Mashonaland: Charter District, Mundy! Col. Herb. 2107!

Some inflorescences collected by Rogers at Baya in Katanga, Belgian Congo (No. 10387), seem to belong here.

(Trim.) 7. B. faleifera, Stapf. Perennial, up to 2 ft. high from a short rhizome with intravaginal and extravaginal innovations. erect, 3-4-noded, terete or compressed below, simple or sparingly branched below, internodes glabrous or more or less stiffly hairy below the nodes. Leaf-sheaths rather tight, glabrous or shortly ciliate on the outer margin upwards; ligules a narrow ciliolate rim; blades linear from an equally wide or somewhat attenuated base, long-tapering to a slender point, 3-10 in. by 1-1½ lin., hard, folded or tightly convolute or flat when old, glabrous, rarely with some hairs near the base, midrib keeled, primary lateral nerves about 3 on each side, only differentiated below, fine. Inflorescence erect, secund, of 3-5 almost equally distant oblique straight or arching dense secund spike-like racemes; common axis 2-3 in. long, slender, subtriquetrous or compressed, glabrous. Racemes 2-seriate or 1seriate by the dovetailing of the ranks, $1\frac{1}{4} - \frac{3}{4}$ in. long, simple, fulvous ; rhachis subherbaceous, flat, about ½ lin. wide, with a prominent slender zig-zag midrib, usually more or less finely pubescent on both sides, long and densely setulously ciliate along the angles, the cilia fulvous, up to 1½ lin. long, internodes about ½ lin. long; pedicels extremely short with subdiscoid tips and a tuft of long yellowish hairs. Spikelets contiguous or imbricate, oblong, obtuse or subacute, 1½ lin. long, more or less hairy. Glumes membranous; lower broadly elliptic, very obtuse or subemarginate, rather firm, glabrous, 9nerved, about two-thirds to four-fifths the length of the spikelet; upper glume corresponding in outline and size to the spikelet, shortly and rigidly hairy upwards, 5-nerved with distant cross-veins from low down. Lower floret neuter or 3, as long as the spikelet: valve similar to the upper glume but hairy on the sides only, with the lateral nerves submarginal and the cross-veins confined to the upper part; valvule lanceolate-oblong, subacute, almost as long as the valve. Upper floret broad-oblong, minutely mucronulate, 1½ lin. long; valve and valvule crustaceous, smooth or very delicately transversely striate.—Panicum falciferum, Trin. ex Nees, Agrost. Bras. 117, Gram. Panic. 127, and Sp. Gram. Ic. ii. t. 147; Hook. Niger Fl. 560; Steud. Syn. Pl. Glum. i, 57; Durand & Schinz, Consp. Fl. Afr. v. 749 (partly).

Upper Guinea. Gold Coast: Acera, Don! Cape Coast Castle, Brass! Christianborg, Johnson, 1021! 1035!

There is very little doubt that this is Panicum collare, Schumach. in Schumach. & Thonn. Beskr. Guin. Pl. 60, the original of which, however, I have not seen.

8. B. fulva, Stapf. Perennial, up to 3 ft. high, densely coespitose on a rather slender rhizome, innovations intravaginal or if extravaginal then growing up close to the mother-culm. Culms erect, rarely shortly geniculately ascending, moderately slender or slightly stout, 3-4-noded, terete or compressed below, mostly simple: internodes glabrous or more or less hirsute below the nodes. Leafsheaths rather tight, the intermediate and upper herbaceous, the basal firmer and more or less persistent, glabrous or hirsute and often densely so; ligules a narrow ciliolate rim; blades lanceolatelinear to linear from an equally wide base, long-tapering to a fine point, from a few inches to over 1 ft. by 2-4 lin., flat, glabrous or more frequently shortly and finely hirsute; midrib slender, slightly prominent below, lateral primary nerves 3-4 on each side, very fine; margins finely cartilaginous, ciliate or glabrous and smooth below, scabrid upwards. Inflorescence erect, secund, sometimes flexuous, of 4-12 equally distant or upwards approximate oblique frequently arched dense secund spike-like racemes; common axis 2 to over 5 in. long, slender, semiterete and channelled or more or less flattened in the upper part, glabrous or slightly pubescent. Racemes 2-seriate, up to $1\frac{3}{4}$ in. long, simple, fulvous or rufous; rhachis subherbaceous, flat, about \(\frac{3}{4}-1\) lin, wide with a prominent slender zig-zag midrib, often purplish, pubescent; margins densely setulosely ciliate, the cilia fulvous, as long as the spikelets; internodes about \frac{1}{2} lin. long; pedicels extremely short with a tuft of long fulyous hairs below the subdiscoid tips. Spikelets subcontiguous or contiguous or imbricate, oblong, obtuse or subacute, $1\frac{1}{2}-1\frac{3}{4}$ lin. long. Glumes membranous, lower broadly-elliptic, very obtuse or submarginate, twothirds to five-sixths the length of the spikelet, glabrous, 9-nerved; upper glume corresponding in outline and size to the spikelet, hairy all over, 5-nerved with distant cross-veins from low down. Lower floret 3, as long as the spikelet; valve similar to the upper glume but hairy on the sides only, the lateral nerves submarginal and the cross-veins confined to the upper part; valvule almost as long as the valve. Upper floret broad-oblong, apiculate, 12 lin. long, otherwise as in B. falcifera.—Panicum falciferum, Durand & Schinz, Consp. Fl. Afr. v. 749 (partly); Rendle in Cat. Afr. Pl. Welw. ii. 168 (partly); Pobéguin, Ess. Fl. Guin. Franc. 214; Cheval. Sudania, 159.

Upper Guinea. Gambia, Skues! Park! French Guinea: Kouroussa, Pobéguin, 473! 547! Southern Nigeria: Oogboro road, Dawodu, 34! West Province, Kitson! Onitsha, Kitson! Northern Nigeria: Lokoja, Richardson! Nupe, dry localities, Barter, 1384! Illah on the Niger, Macleod! Abinsi, Dalziel, 896! Katagum, Dalziel, 256! Cameroons: Sanaga, Zenker, 1476!
North Central. Baghirmi: between Yalal and Moure, Chevalier, 9452!

= 8 B. Comaensis Vanderyt-fide Robyns



Nile Land. Jur: Agada, Schweinfurth, 2200! Bongoland: Matyu River, Schweinfurth, 4003! Addai, Schweinfurth, 2174! Abyssinia: Gallabat; Matamma, Schweinfurth, 1149! British East Africa: without precise locality, Powell, 23 bis!

Lower Guinea. Angola: Pungo Andongo; in marshy places near Quibanga,

Welwitsch, 2775! and without precise locality, Welwitsch, 2845!

9. B. brevis, Stapf. Perennial, $\frac{1}{2}$ - $1\frac{1}{2}$ ft. high, densely coefficient with intra- and extravaginal innovations, the cataphylls of the former glabrous. Culms erect or geniculately ascending, mostly 2-noded, terete or compressed below, simple or sparingly branched at the base; internodes glabrous or slightly hairy below the nodes. Leaf-sheaths tight (the lower) or more or less loose and herbaceous (the upper), the basal rather firm, persistent, turning brown, often ciliate on the outer margin, otherwise glabrous or beset with scattered fine tubercle-based hairs; ligules a narrow ciliate rim. Blades linear-lanceolate to linear from an equally wide or slightly rounded base, tapering to an acute point, $1\frac{1}{2}$ -7 in. by $2-2\frac{1}{2}$ lin., flat, dull green, moderately firm, glabrous except for the margins which are more or less ciliate at least towards the base and scabrid or minutely spinulose; midrib very slender like the primary lateral nerves (3-4 on each side). Inflorescence erect, secund, of 6-10 about equally distant suberect or spreading straight or arching dense secund spike-like racemes; common axis 2-4 in. long, slender, subtriquetrous, glabrous. Racemes 2-seriate or 1-seriate by the dovetailing of the ranks, $1\frac{1}{4} - \frac{1}{2}$ in, long, simple, greenish; rhachis subherbaceous, flat, about $\frac{1}{3}$ lin. wide, with a prominent slender zig-zag midrib, very finely pubescent on both sides, ciliate along the margins, cilia very fine, mostly under 1 lin. long; internodes almost \{\frac{1}{2}} \text{ lin. long}; pedicels extremely short with subdiscoid tips and some long yellowish Spikelets contiguous or imbricate, about $1\frac{1}{4}$ lin. long, more or less hairy. Glumes membranous; lower broad-elliptic, very obtuse or emarginate, glabrous, 7-9-nerved, two-thirds to threequarters the length of the spikelet; upper glume corresponding in outline and size to the spikelet, shortly and finely hairy upwards, 5-nerved with distant cross-veins from low down or from the middle upwards. Lower floret of, as long as the spikelet; valve similar to the upper glume, but hairy on the sides only, with the lateral nerves submarginal, the cross veins confined to the upper part. Upper floret as in B. falcifera if not slightly smaller.

Upper Guinea. French Guinea: Fouta Jalon; Diaguissa, 4250–4600 ft., Chevalier, 12659 bis! Gold Coast: Salaga, Krause! Volta River District; Afram plains, Johnson, 724!

10. B. soluta, Stapf. Perennial, loosely cæspitose, up to over 2 ft. high, from a very slender rhizome with extravaginal innovations which grow sometimes into short creeping stolons and are covered with glabrous cataphylls. Culms very slender, often geniculately ascending, 5-6-noded, compressed below, more or

less terete upwards, simple or more or less branched in the lower part, internodes glabrous, rarely with some tubercle-based hairs below the nodes. Leaf-sheaths somewhat loose, the lower often slipping off the stem and only moderately firm, the upper herbaceous, all glabrous except at the sometimes ciliate margins, rarely the basal finely hirsute; ligules a ciliolate rim; blades linear from an equally wide base, long-tapering to an acute point, 3-4 in. by 2-2½ lin., flat, bright green, glabrous or ciliate particularly towards the base, margins obscurely cartilaginous, smooth or scabrid upwards, midrib like the primary lateral nerves very slender. Inflorescence erect, secund, of few to 8 almost equally distant oblique straight or arching dense secund spike-like racemes; common axis up to 4 in. long, very slender, semiterete or subtriquetrous, glabrous. Racemes mostly 1-seriate by the dovetailing of the ranks, from over $1-\frac{1}{2}$ in. long, simple, fulvous or greenish; rhachis flat, up to ½ lin. wide, often dull purplish with a slender prominent zig-zag midrib, finely pubescent on both sides, ciliate along the margins, cilia very fine, fulvous, up to 1 lin. long; internodes up to $\frac{1}{2}$ lin. long; pedicels extremely short, with some long yellowish hairs below the more or less discoid tips. Spikelets contiguous or imbricate, $1\frac{1}{4}-1\frac{1}{2}$ lin. long, more or less hairy. Glumes membranous; lower broad-elliptic, very obtuse or subemarginate, glabrous, 7-11-nerved, two-thirds to three-quarters the length of the spikelet; upper glume corresponding in outline and size to the spikelet, finely hairy upwards, 5-nerved with few distant crossveins from low down. Lower floret o, as long as the spikelet; valve similar to the upper glume but hairy on the sides only, with the lateral nerves submarginal, the cross-veins confined to the tip. Upper floret as in B. falcifera if not slightly smaller.

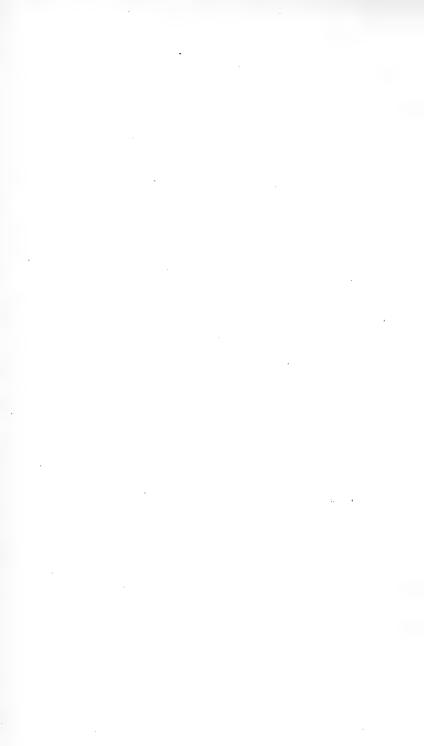
Nile Land. Uganda: Mabira forest, Ussher, 3! Kipayo, 4000 ft., Dummer, 677! Tugalambo, Dummer, 3915!

Lower Guinea. Belgian Congo: Stanley Pool District; between Dembo

and Kisantu, Gillet, 1578!

11. B. stigmatisata, Stapf. Annual, over 2 ft. high. Culms tufted or almost solitary, ascending from a sometimes decumbent and rooting base, geniculate below, branched or almost simple, 5-many-noded, compressed below, glabrous and smooth. Leaves glabrous, apart from the ciliate sheath-margins; sheath rather loose, striate, the lower more or less compressed and keeled, the uppermost very long; ligules reduced to a narrow minutely ciliolate membranous rim; blades linear to linear-lanceolate from a more or less rounded or shortly narrowed base, tapering to an acute point, from 1 to over 7 in. by 3-6 lin., somewhat rigid though thin, smooth except on the cartilaginous crisped or crenulate or almost straight and always minutely spinulous margins; nerves numerous, very fine, the primary lateral usually rather obscure, about 4 on each side, midrib very slender. Inflorescence of 3-1 (sometimes 5, Mez) oblique or suberect secund spike-like racemes, common axis \(\frac{3}{4}-2\) in. long, sometimes

.



continued beyond the uppermost raceme as a filiform point, semiterete or more or less flattened, minutely pubescent on the face, shortly hairy at the nodes, otherwise glabrous. Racemes simple, dense, 1-23 in. long, straight or slightly arching or flexuous, 2seriate in plan but usually 1-seriate by the dovetailing of the ranks; rhachis rather flat, with an almost straight slightly prominent keel on the face, ½ lin. wide; scaberulous along the angles, sometimes with scattered hairs, internodes \(\frac{3}{2} \) to almost 1\(\frac{1}{2} \) lin. long; pedicels solitary, extremely short, sparingly setulose. Spikelets contiguous or imbricate, oblong, acute, 2-21 lin. long, pale greenish, quite glabrous. Glumes unequal, membranous, the lower broad-oblong, very obtuse, about 11-nerved, nerves very fine; upper glume corresponding in outline and size to the spikelet, prominently 9nerved and reticulately cross-veined. Lower floret neuter or 3, as long as the spikelet: valve somewhat flattened on the back, broadoblong, subacute or acute, 5-nerved with prominulous cross-veins, lateral nerves near the margin; valvule oblong, subacute, somewhat shorter than the valve, flaps very narrow. Upper floret ellipticoblong in outline, obtuse, 1½ lin. long, pale or brownish, shining: valve and valvule crustaceous, the former obscurely wrinkled on the sides, otherwise almost smooth like the valvule. Anthers less than \frac{1}{2} lin. long. Grain elliptic in outline, obtuse, 1 lin. long, flat on the back, moderately convex on the face, yellowish; scutellum ovatelanceolate, three-quarters the length of the grain.—Panicum stigmatisatum, Mez in Engl. Jahrb. xxxiv. 140.

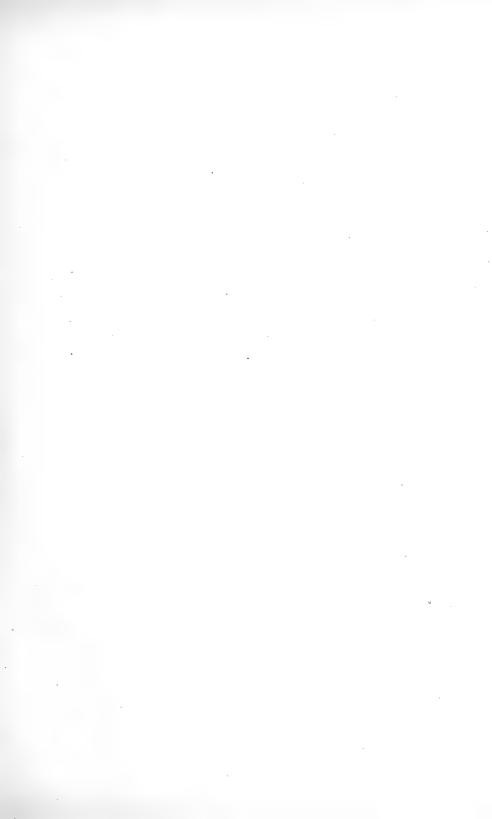
Upper Guinea. Gambia, Park! French Guinea: Timbo, Pobéguin, 1711!
Fouta Jallon, between Trébéléya and Timbo, Chevalier, 18308! Northern Nigeria: Jeba on the Niger, Barter!
Nile Land. Jur: Ghattas' Great Scriba, Schweinfurth, 2299!

(Rendle) 12. B. brevispicata, Stapf. Annual, loosely tufted, up to $1\frac{1}{2}$ ft. high. Culms ascending from a decumbent and rooting base, terete or somewhat angular, glabrous and smooth, many-noded, simple, lower 5-7 internodes short (1 in. or less) and completely covered by the sheaths. Leaf-sheaths rather loose, slightly compressed, striate, glabrous except at the pubescent or ciliate margins, very smooth; ligules reduced to a narrow ciliolate rim; blades linearlanceolate from an equally broad base, tapering to an acute almost pungent point, $1\frac{1}{3}$ in. by 3-4 lin., flat or with involute margins, rigid, loosely hirsute with tubercle-based hairs on the upper surface, glabrous and smooth below, margins stoutly crisped, spinulose to spinulose-serrulate or in parts smooth, nerves very numerous, rather obscure below, midrib very slender; uppermost blade reduced to a small subulate point or suppressed. Inflorescence at length long-exserted, of 2 or 1 suberect or oblique sessile spiciform racemes; common axis about $\frac{3}{4}$ -1 in. long, semiterete or somewhat flattened, finely pubescent on the face, otherwise glabrous

and smooth. Racemes simple, rather dense, somewhat slender, ³/₄-1 in. long, 2-seriate in plan, but 1-seriate by the dove-tailing of the ranks; rhachis somewhat flat with a slender raised midrib on the face, almost \frac{1}{2} lin. wide, hairy on the pulvinus, otherwise glabrous, lateral angles thickened and smooth; pedicels solitary, very short, glabrous or with a few setules from below the subdiscoid tips. Spikelets laterally contiguous, imbricate (seen from the front), broadly oblong to elliptic-oblong or subobovate, obtuse, $1\frac{1}{2}$ lin. long, greenish, glabrous. Glumes similar in shape, of equal or almost equal length, membranous; the lower broad-elliptic to obovate-elliptic, clasping at the base, obtuse, as long or almost as long as the spikelet, 13-17-nerved with free nerve-ends and without cross-veins; upper 7-nerved with numerous cross-veins, as long as the spikelet. Lower floret 3, almost or quite as long as the spikelet: valve broad-oblong, subacute, membranous, 5-nerved, with the lateral nerves near the margin and with more or less prominulous numerous cross-nerves; valvule subobtuse, slightly shorter than the valve, with smooth fine keels. Upper floret &, elliptic in outline, obtuse or subapiculate, almost as long as the spikelet, pale, dull; valve and valvule chartaceous, delicately rugulose or almost smooth. Anthers 1 lin. long.—Panicum brevispicatum, Rendle in Cat. Afr. Pl. Welw. ii. 168 (partly).

Rendle also refers to his Panicum brevispicatum, a specimen collected by Welwitsch near Muta Lucala in the Pungo Andongo district (no. 2726). This, however, although very similar in many respects, differs in having slightly smaller oblong spikelets with the lower glume constantly only half the length of the spikelet and the upper glume somewhat shorter than the glossy fertile floret. It closely approaches in this way B. reticulata, whose spikelets are, however, still smaller and narrower and have only 11 nerves in the lower glume; further, the blades of B. reticulata are quite glabrous on the upper side, although otherwise of the type of B. brevispicuta. Welwitsch 2726 has also 4–5-noded culms with short weak flowering branches from most of the nodes except the lowest, and the lower nodes are relatively long; but this difference may be entirely due to edaphic conditions and need not be insisted upon. Rendle also quotes under P. brevispiculum a specimen collected by Mungo Park in Gambia, which in my opinion is B. stigmatisata.

13. B. reticulata, Stapf. Annual (always?), ½-1½ ft. high, loosely tufted. Culms ascending from a geniculate and frequently prostrate many-noded base, branched, very slender, terete or somewhat compressed below, glabrous and smooth, the branches often gathered in fascicles. Leaves crowded above the prostrate bases or more or less evenly distributed; sheaths somewhat loose, compressed (at least the lower), striate, glabrous except at the ciliate margins; ligules reduced to a ciliate membranous rim; blades lanceolate to linear-lanceolate from a more or less rounded base, tapering to an acute point, 1-3 in. by $3\frac{1}{2}$ - $4\frac{1}{2}$ lin., flat or slightly involute, somewhat firm but rather thin, glabrous, margins stoutly car-





tilaginous, sometimes crisped, loosely and very minutely to densely spinulose upwards or almost smooth, nerves very numerous, rather obscure below, primary lateral nerves obscurely differentiated, midrib very slender; uppermost blades reduced to a subulate point. Inflorescence shortly exserted, of 3-1 suberect or oblique secund sessile spiciform racemes; common axis 2-1 in. long, semiterete or flattened, glabrous, smooth. Racemes simple, slender, moderately dense, $\frac{2}{3}-1\frac{1}{4}$ in. long, 2-seriate in plan but usually 1-seriate by the fusion of the ranks: rhachis flattened, with a wavy or almost straight prominent keel on the face, $\frac{1}{4}$ lin. wide, pubescent at the short pulvinus, otherwise glabrous and smooth or almost so, greenish, internodes 3-1 lin. long; pedicels solitary, very short with subdiscoid tips, glabrous and smooth. Spikelets subcontiguous if 1-seriate, otherwise discontiguous, oblong, obtuse to subacute, $1\frac{1}{4}-1\frac{1}{2}$ lin. long, greenish, glabrous. Glumes very unequal, membranous; the lower broad-ovate or rounded, slightly clasping at the base, obtuse, one-third to one-half the length of the spikelet, about 11-nerved without cross-veins; upper glume corresponding in outline and size to the spikelet, 7-9-nerved, with numerous cross-veins which like the nerves are slightly prominu-Lower floret \mathcal{L} , as long as the spikelet; valve flattened on the back, broad-oblong, subobtuse to acute, thinly membranous, 5-nerved with lateral nerves near the margin, and more or less prominulous cross-nerves; valvule oblong, slightly shorter than the valve with smooth fine keels. Upper floret \(\noting\), oblong, obtuse, almost as long as the spikelet, pale; valve and valvule crustaceous; very obscurely pitted or almost smooth, keel-margins of valvule faint. Anthers \(\frac{1}{2}\) mm. long.

Lower Guinea. Belgian Congo: Stanley Pool District; Mokaba, *Vanderyst*, 3864! 3889! 3619! Kitebe, *Vanderyst*, 3687! on sand banks at Muschie, *Vanderyst*, 3971!

14. B. interstipitata, Stapf. Perennial (base not known). Culms robust, evidently tall with the upper internodes exserted and accompanied by short leafy branches, quite glabrous and smooth. Leaves quite glabrous; sheaths rather loose, very smooth and shining, the upper 4-5 in. long; ligules a dense fringe of hairs, 1 lin. long; blades linear from a broadly rounded or cordate base, tapering to a long slender point, up to 2 ft. by 1 in., flat, green, spinulously scabrid along the margins, otherwise smooth and glabrous, midrib prominent below, primary lateral nerves 6-7 on each side. Inflorescence secund, of 9-15 mostly solitary sessile or subsessile spike-like racemes, the lower of which (or their pairs) are widely distant whilst the upper are much more approximate; common axis slightly stout, smooth, glabrous. Racemes secund, simple, 2-seriate, rather dense, glabrous, straight or arching or flexuous, 4-2 in. long; rhachis flattened, herbaceous with a midrib

which is stout and obtuse on the back and very slender on the face, over 1 lin. wide, slightly rough on the angles, internodes up to 1 lin. long; pedicels solitary, slender, very short, glabrous. Spikelets dense, but those of one rank hardly contiguous, although incumbent on those of the other, oblong, subacute, somewhat flat on the back, $2\frac{1}{4}-2\frac{1}{2}$ lin. long, drying brown. Glumes very dissimilar, separated by an internode, ½ lin. long, thinly membranous; lower very broadly ovate, shortly and acutely acuminate, broadly clasping, one-third to almost half as long as the spikelet, 11nerved, the nerves anastomosing; upper corresponding in outline and size to the spikelet, hispidulous towards the tip, 5-nerved, the nerves more or less raised. Lower floret 3, as long as the spikelet: valve very similar to the upper glume; valvule almost as long as the valve. Upper floret $\mbox{\colored}$, $2-2\frac{1}{4}$ lin. long, oblong, subapiculate, brownish; valve and valvule crustaceous. Anthers 1½ lin. long, purple. Stigmas purplish-black.—Panicum interstipitatum, Stapf ex Cheval. Sudania, 190 (name only).

South Central. French Congo: Upper Oubangui; Desbordeville, Chevalier, 11014!

15. B. platytænia, Stapf. Perennial and apparently tall (base not known). Culms somewhat stout, upper internodes terete, glabrous and smooth, 7-8 in. long. Leaf-sheaths (upper) terete, tight, strongly nerved, glabrous except for some fine tuberclebased hairs in the upper part; ligules a dense fringe of rigid hairs, 1/2 lin. long; blades lanceolate-linear to linear from a broader rounded base, long-tapering to a slender point, 4-7 in. by $\frac{1}{2}$ -1 in., flat, thin, quite glabrous, midrib slender, prominent below, lateral primary nerves 5-7 on each side, fine. Inflorescence erect, over 6 in. long, subsecund, of 10-12 spreading and usually arching sessile or (owing to the arrest of the spikelets) shortly peduncled (the lowest) spiciform secund racemes; common axis ending abruptly or with a short point above the uppermost raceme, terete or subterete and slightly channelled below, subtriquetrous or flattened towards the top, finely pubescent on the concave or flat face, otherwise glabrous, smooth, Racemes dense, 2-seriate, simple, $2\frac{1}{2}-1\frac{1}{4}$ in. long, with the uppermost spikelets arrested and minute, unequally distant (the lowest by up to 2 in., the following by $1-\frac{3}{4}$ in.), or here and there approximate or opposite or 2-nate; rhachis ribbon-shaped, subherbaceous, up to $1\frac{1}{2}$ lin. wide, with a slender midrib slightly raised on the face, glabrous except at the villosulous base, margins minutely ciliolate, internodes about 3 lin. long; pedicels solitary, extremely short, slightly flattened, alternately to the right and the left of the midrib. Spikelets laterally subcontiguous or those of one rank subimbricate, ovateoblong to broad-oblong, acute, somewhat flat on the back, $2-2\frac{1}{4}$ lin. long, pale greenish. Glumes very dissimilar, membranous;



8. 15 60 US. 1386856 US. 38. Brachiaria.]

lower broad-ovate, 2-denticulate, 8-10-nerved, without a middle nerve, lateral nerves anastomosing; upper corresponding in outline and size to the spikelet, 7-nerved, loosely hairy above the middle. Lower floret 3, equalling the spikelet: valve very similar to the upper glume but slightly depressed on the back and 5- or incompletely 7-nerved; valvule almost as long as the valve, oblong, acute; anthers 1½ lin. long. Upper floret \u2203, slightly shorter than the spikelet, broad-oblong, subacute or minutely apiculate, white; valve and valvule crustaceous, smooth.

Lower Guinea. Belgian Congo: without precise locality, Dewèvre!

Although the racemes are typically simple, a short secondary raceme may be seen occasionally standing out among the spikelets, but without any definite order.

16. B. vittata, Stapf. Perennial (?), base unknown. Culms slender, uppermost internode but one $4\frac{1}{2}-5\frac{1}{2}$ in. long, the following 41-6 in. up to the inflorescence branched, quite glabrous. Sheath loose, thin, striate, glabrous, the constricted portion at the base (sheath-nodes) rather long, brown; ligules a very narrow ciliate rim; blade lanceolate, attenuated to a fine point, up to 8 in. by almost 5 lin., rather thin, quite glabrous or with some very fine hairs underneath, nerves numerous, 4-5 primary laterals on the underside, margins scabrid. Inflorescence secund, 4-6 in. long, of 3-7 distant subhorizontal shortly peduncled or upwards subsessile secund spiciform racemes; common axis very slender, subterete below, angular and often triquetrous above, smooth or almost so. Racemes simple, $2-1\frac{1}{4}$ in. long, 2-seriate, moderately dense or loose; peduncles up to 6 lin. long; rhachis ribbon-like, almost membranous, flat or with the scaberulous margins inrolled, up to 1 lin. wide, with a delicate zig-zag midrib on the face, internodes \(\frac{3}{4}\)-1 lin. long; pedicels extremely short, solitary or 2-nate, sparingly puberulous or glabrous with subdiscoid tips. Spikelets subcontiguous or distinctly discontiguous, oblong, somewhat flat on the back, over 2 lin. long, acute to subobtuse, pale greenish. Glumes very unequal; the lower very broadly ovate, clasping, obtuse to subacute, half the length of the spikelet, thin, finely and prominently 9-nerved, the nerves anastomosing; the upper glume corresponding in size and shape to the spikelet, more firmly membranous, finely hairy upwards, 7-nerved, the nerves more prominent upwards and there obscurely crossveined. Lower floret of, as long as the spikelet: valve very similar to the upper glume but 5-nerved and depressed between the inner nerves; valvule oblong, subacute, almost as long as the valve; anthers 1 lin. long. Upper floret \u2200eq, obluse, with a minute mucro, 7 lin. long: valve and valvule crustaceous, pale, smooth. the latter with rather prominent keels.

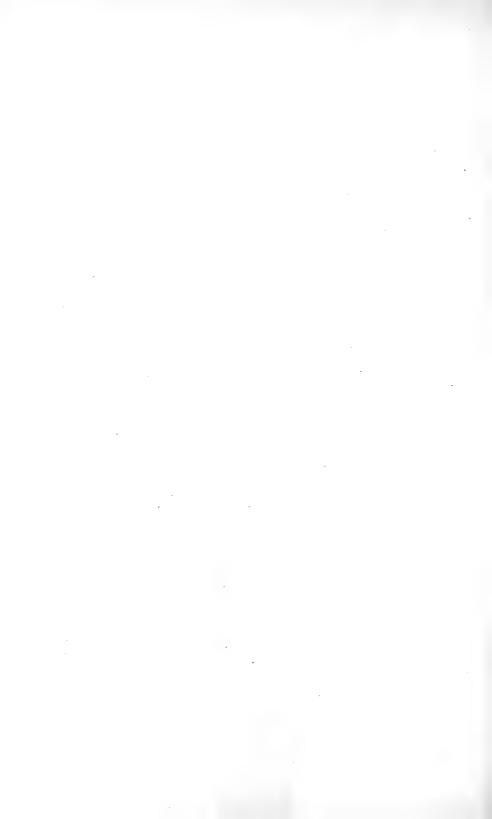
North Central. French Congo: at Bonga on the Sanga River, Schlechter, 12663!

17. B. latifolia, Stapf. Perennial, base unknown, but apparently a tall coarse grass, sheathed high up with a leaf-branch from one of the upper internodes, Leaf-sheaths moderately tight, terete, keeled upwards, finely striate, glabrous and smooth; ligules a ciliolate narrow rim; blades linear from an almost equally wide base, up to over 10 in. by ½ in., green, flat, quite glabrous, margins almost smooth or scabrid, primary lateral nerves up to 5 on each side, like the midrib very slender underneath. Inflorescence about 8 in. long, terminating with a subulate point, of about 7 sessile spreading straight or subfalcate secund spike-like racemes; common axis slender, terete and deeply channelled below, triquetrous above, scaberulous along the angles upwards, glabrous, internodes $1\frac{1}{2}$ in. long in the lower and intermediate part, $\frac{1}{2} - \frac{3}{4}$ in. in the upper third. Racemes simple, dense or the lowest interrupted towards the base, 2-seriate, from almost 4 (lowest) to 1 in. long, greenish; rhachis flat, green, straight, $\frac{1}{2}$ lin. wide, glabrous, with scaberulous angles, the facial angle (midrib) slender, internodes $\frac{1}{2}$ or in interrupted racemes up to 3 lin. long; pedicels solitary or partly 2-nate in the lowest racemes, all very short, glabrous or almost so with discoid Spikelets contiguous except in interrupted racemes, oblong, acute or subacute, somewhat flat on the back, $2\frac{1}{4}$ lin. long, glabrous. Glumes very unequal, membranous; the lower broad-ovate, obtuse, 5-nerved, half the length of the spikelet or almost so; upper corresponding in outline and size to the spikelet, 7-nerved, loosely crossveined near the tip. Lower floret 3, as long as the spikelet: valve very similar to the upper glume, but dorsally slightly flattened and 5-nerved; valvule oblong, obtuse, almost as long as the valve, flaps wide; anthers orange, $1\frac{1}{4}$ lin. long. Upper floret \circlearrowleft , oblong, subacute or subapiculate, 13 lin. long, pale; valve and valvule crustaceous, finely transversely wrinkled, the latter with stout keels; anthers \frac{1}{4} lin. long; stigmas black, very conspicuous.

Mozambique Distr. Nyasaland: Elephant marsh at the Shire River, Kirk!

18. B. mutica Stapf. Perennial, 3-6 ft., or occasionally to 8 ft. high. Culms ascending from a sometimes long prostrate and copiously rooting base, stout, terete, usually many-noded and sheathed high up, simple or sparingly branched, glabrous, often waxy pruinose below the nodes. Leaf-sheaths tight, terete, rather firm, those of the prostrate bases decaying, glabrous and smooth or hirsute with tubercle-based hairs, mostly copiously bearded at the nodes; ligules a ciliolate rim; blades linear from a shortly and slightly constricted base, long-tapering to a slender point, from a few inches to over 1 ft. by \(\frac{1}{3}\) in., flat, somewhat rigid or flexuous, glabrous or, rarely, more or less hirsute, margins scabrid, midrib slender like the primary lateral nerves (up to over 6 on each side) but little conspicuous. Panicle oblong to ovate-oblong in outline, subsecund or almost quaquaversal, often slightly flaccid, 4-8 (mostly 6) in. long; common rhachis

v



terete to semiterete and more or less deeply channelled or triquetrous upwards, scabrid along the angles, glabrous. Racemes numerous, solitary or irregularly approximate, sometimes paired or in false whorls, shortly peduncled (the lowest) or subsessile, obliquely spreading, usually more or less flexuous, 2- or irregularly pluriseriate, 3 (rarely 5) to 1 in. long, mostly compound and then frequently interrupted or the upper, rarely all, simple and more or less dense, glabrous, greenish or tinged with purple; rhachis flat, herbaceous with a slender raised midrib up to \frac{1}{3} lin. wide, with projecting scabrid angles, villosulous at the base, otherwise glabrous, internodes of the more evenly dense racemes \frac{1}{2}-1 lin. long; secondary racemes usually very short and 6-3-spiculate, or of the lowest racemes occasionally up to 1 in. long; pedicels solitary or paired, all very short, or if paired then the longer up to \frac{1}{2} lin. long, scaberulous with smooth discoid tips, frequently with a few setules. Spikelets laterally contiguous or discontiguous, those of the secondary racemes frequently imbricate, oblong to lanceolate-oblong, acute, somewhat flat on the back, $1\frac{1}{2}$ - $1\frac{3}{4}$ lin. long, glabrous. Glumes dissimilar: the lower broad-ovate, acute to subacute, from less than a third to not quite half the length of the spikelet, membranous, faintly 3-5nerved, often tinged with purple; upper corresponding in outline and size to the spikelet, 5-7-nerved with few faint cross-nerves towards the tips. Lower floret 3: valve as long as the upper glume and similar to it, but 5-nerved and more or less depressed on the back; valvule narrowly oblong, subacute, almost as long as the valve, with narrow flaps; anthers 1 lin. long. Upper floret &, slightly shorter than the spikelet (mostly 11 lin. long), oblong, subacute or very minutely apiculate, pale yellowish; valve and valvule crustaceous, very finely transversely wrinkled or almost smooth; stigmas blackish-purple, very conspicuous.—*Panicum muticum*, Forsk. Fl. Ægypt.-Arab. 20; Schult. Mant. ii. 225; Link, Hort. Berol. i. 206; Kunth, Enum. i. 93; Steud. Syn. Pl. Glum. i. 40; Kew Bulletin, 1894, 384, and 1897, 209; Hook, f. Fl. Brit. Ind. vii. 34, and in Trim. Handb. Fl. Ceyl. v. 140; Durand & De Wild. Mat. Fl. Congo, i. 91; De Wild. Not. Pl. Util. Congo, 509; Stapf. in Johnston, Liberia, ii. 666; Cheval. Sudania, i. 34. P. numidianum, Lam. Ill. i. 172; Encycl. iv. 739; Desf. Fl. Atlant. i. 60, t. 11; Roem. & Schult. Syst. ii. 433; Nees, Agrost. Bras. 122; Trin. Pan. Gen. 156, and Sp. Gram. Ic. t. 174; Kunth, l.c. 92; Steud. l.c. 345; Schweinf. Beitr. Fl. Aethiop. 301; Doell in Mart. Fl. Bras. ii. ii. 187; Coss. & Dur. Fl. Alg. Expl. Scient. Alg. ii. 30; Boiss, Fl. Or. v. 438; Batt. & Trab. Fl. Algér (Monoc.) 36; Durand & Schinz, Consp. Fl. Afr. v. 757; Franch. Contr. Fl. Congo Franc. 38; Hack. in Bull. Herb. Boiss. iv. App. iii. 14; Rendle in Cat. Afr. Pl. Welw. ii. 172. P. purpurascens, Raddi ex Opiz in Flora, 1822, 266; Nees, Agrost. Bras. 240. P. barbinode, Trin. Sp. Gram. Ic. t. 318, and Pan. Gen. 168; Steud. l.c. 67; Duthie, List Grass. N.W. Ind. 2.

P. sarmentosum, Benth. in Hook. Niger Fl. 561; not of Roxb. P. equinum, Steud. l.c. P. punctulatum, Steud. l.c. 62. P. pictigluma, Steud. l.c. 73. P. molle, Griseb. Fl. Brit. West Ind. 547 (excl. syn.); Baker, Fl. Maurit. 436; Durand & Schinz, Consp. Fl. Afr. v. 755; De Wild. Étud. Fl. Katanga, 11, and Not. Pl. Util. Congo, 507; not of Sw.

Upper Guinea. Senegal: Tivaouane, Chevalier, 2294! Middle Niger: Sompi, Chevalier, 2295! Liberia: Grand Bassa, Vogel, 32! Northern Nigeria: Nupe, in wet places, Barter, 1045! in wet places near Sokoto, Dalziel, 481! Cameroons:

Victoria, Winkler, 32!

Nile Land. Sudan: near the White Nile, 12° 10′ N. lat., Schweinfurth, 1047! Lower Guinea. French Gaboon, Griffon de Bellay. Libreville, on the River Shire, Thollon, 164, 708. Belgian Congo: Stanley Pool District; Kunzulu, Vanderyst, 5182! Kisantu, Gillet, 630! 2322! between Leopoldville and Mombasi, Gillet, 2620! Cataracts District; Kimbambele, Vanderyst, 4326! Angola: Golunga Alto (?), Welwitsch, 2960!

Mozambique Distr. German East Africa: Amani, Herb. Amani, 384!

It is apparently a native of South America and West Africa, but introduced elsewhere.

In accepting Forskal's name "muticum" for this species I have relied on Ascherson's identification (Asch. & Schweinf, Ill. Fl. Egypt. 160) of the type with the Algerian P. numidianum. Schweinfurth (Plante Utile Eritr. 53) says that according to the Abyssinians this is one of their best fodder grasses for milk, as its Tigre name "sari-zaba" (milk-grass) implies. He also adds that it is common in the lower region; but neither he nor the Italian collectors seem to have collected it in Eritrea, and there is no record of its occurrence in Abyssinia. It is no doubt an excellent fodder grass, grown in many parts of the tropics and known as "Para grass," "Mauritius grass," or "Water grass."

19. B. decumbens, Stapf. Perennial. Culms ascending from a long prostrate base, to 1 or $1\frac{1}{2}$ ft. high, many-noded, rooting from the lower nodes which are generally short or more or less angular, the uppermost internode by far the longest and very slender, the whole culm glabrous. Leaf-sheaths of the base longer than the internodes, at length decaying, like the others tight, terete or somewhat compressed and keeled upwards and more or less finely hirsute; ligules a ciliolate rim; blades narrowly lanceolate from a rounded base, tapering to an acute point, $1\frac{1}{2}$ -3 in. by 4-5 lin., flat, thin, green, shortly hirsute, margins finely cartilaginous, partly crisped, scabrid to spinulously ciliate, primary lateral nerves about 4 on each side, like the midrib very slender. Inflorescence secund, of 2-3 sessile spreading more or less arching secund spiciform racemes separated by very slender semiterete almost smooth and glabrous internodes, the common axis not produced beyond the upper raceme. Racemes simple, 2-seriate, very dense, secund, 2-3 in. long; rhachis subherbaceous, flat, up to over ½ lin. wide, dark purple and glabrous on the back, green and minutely pubescent on the face, ciliate along the angles, the cilia yellowish, less or much less than half the length of the spikelets, internodes about \frac{1}{2} lin. long; pedicels solitary, very short, rather stout, almost glabrous, alternately to the right and the left of the very slender midrib. Spikelets closely contiguous, oblong, 19 = B. Emini (Mez) Roberns Pannin Emin Mez. 19+ B. Bequaertin Robons

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-- spekts larger abturets subacute, glabrons
or nearly as

Cong. Belge.

subacute, more or less convex on the back, 2 lin. long, pale greyishgreen, hairy. Glumes very unequal, membranous; lower broadovate, broadly clasping, obtuse and subemarginate to acute, one-third to half the length of the spikelet, finely 9-nerved; upper corresponding in outline and size to the spikelet, very convex, 7-nerved, silkily hairy particularly upwards. Lower floret \mathcal{J} , as long as the spikelet: valve very similar to the upper glume but 5-nerved, less or hardly convex and less hairy; valvule oblong, subobtuse, with narrow flaps and very fine keels, almost as long as the valve; anther $1\frac{1}{4}$ lin. long. Upper floret \mathcal{J} , almost as long as the spikelet, broad-oblong; valve minutely apiculate, like the valvule crustaceous, whitish and almost quite smooth.

Nile Land. Uganda: Karagwe, Speke & Grant, 488! M'pumu, 4000 ft., Dummer, 1070!

20. B. rugulosa, Stupf. Perennial, up to $1\frac{1}{2}$ ft. high. Culms slender, ascending from a decumbent base, 5-6-noded, with short leafy branches from the lower nodes, compressed or angular, glabrous except below the inflorescence. Leaf-sheaths rather loose, at least in the lower part and there frequently slipping off the stem, sparingly hairy or glabrous, but ciliate along the margin, striate; ligules a ciliolate rim; blades narrowly linear from an equally wide base, tapering to a somewhat callous fine point, 3-4 in. by $1-1\frac{1}{2}$ lin., flat or more or less involute, rigid, glabrous and smooth, nerves very fine, midrib very slender. Inflorescence secund, 3-4 in. long, upright, of 4-6 oblique distant secund spiciform spikes; common axis continued beyond the uppermost raceme into a fine subulate point, up to 3 lin. long, semiterete, channelled adaxillarily, scaberulous along the angles and usually ciliate or ciliolate above the nodes. Racemes dense, 2-seriate, $1-\frac{3}{4}$ in. long, simple, sessile or subsessile, rarely shortly peduncled with some arrested spikelets at the base; rhachis flat, straight or almost so, up to $\frac{1}{2}$ lin. wide, with a very fine zig-zag rib on the face, angles shortly ciliate, base finely tomentose, internodes \frac{2}{3} lin. long; pedicels solitary, extremely short with some fine hairs from below the subdiscoid tips. Spikelets closely contiguous, oblong, subacute, moderately convex on the back, $1\frac{1}{2}$ lin. long, glabrous, pale green variegated with dull purple. Glumes very unequal; the lower membranous, broad-ovate, obtuse, 5- to sub-7-nerved, nerves not anastomosing; upper glume corresponding in outline and size to the spikelet, more firmly membranous, 5-nerved with or without some obscure cross-veins. Lower floret 3, as long as the spikelet; valve very similar to the upper glume, slightly flattened or depressed on the back; valvule oblong, acute, almost as long as the valve; anthers 1 lin. long. Upper floret \(\breve{\pi} \), very slightly shorter than the spikelet, oblong, subobtuse, whitish; valve and valvule crustaceous, closely and finely but very distinctly transversely rugose.

Nile Land. British East Africa: Nairobi, 5450 ft., Lyne, 154! Dowson, 257 partly!

21. B. distachyoides, Stapf. Annual, $1-\frac{1}{2}$ ft. high, the whole plant pale green or slightly glaucous and quite glabrous. Culms in small fascicles, erect or suberect or geniculately ascending to prostrate at the base, frequently rooting from the lowest nodes with rather stout root-fibres, terete or the lower internodes somewhat compressed, 4-6-noded, frequently branched, the upper branches developed as leaf-tufts shortly emerging from the sheaths at the time of flowering of the main culms. Leaf-sheaths rather thin or the upper herbaceous, the lower more or less compressed and often slipping off the culm, shorter than the internodes, smooth; ligules reduced to a dense line of hairs; blades narrowly linear from an equally wide or slightly narrowed base, long-tapering to a slender point, 2-5 in. by 1-2 lin., the lowest usually short, flat, smooth, finely and closely nerved, with about 2-3 primary lateral nerves on each side; midrib slender. Panicle at length shortly, if at all, exserted, of 4-2 solitary distant subsecund suberect or oblique spike-like racemes or reduced to a single raceme; common axis rarely much over 3 in. long, slender, grooved to widely concave (upwards) on the adaxillary side, continued beyond the insertion of the uppermost raceme into a subulate or linear-subulate point, $1-2\frac{1}{2}$ lin. long, smooth or scabrid along the margins of the uppermost internodes; racemes slender, 1-1½ in. long, straight or more or less arching, subsessile with a finely pubescent pulvinus or the lowest shortly peduncled, quite simple; rhachis semi-involute or at length almost flat, subherbaceous, up to $\frac{3}{4}$ lin. wide (flattened out), glabrous and smooth on the back, scaberulous along the margins and usually on the very slender slightly raised rounded midrib of the face; pedicels solitary, $\frac{3}{4}-1\frac{1}{4}$ lin. apart, reduced to scaberulous stumps with discoid tips. Spikelets more or less distinctly 1-seriate and laterally contiguous, oblong, subacute, flattened on the back, $1\frac{1}{2}$ — $1\frac{3}{4}$ lin. long, glabrous, very pale greenish. Glumes very unequal; lower broad-ovate, subacute or obtuse, half as long (or nearly so) as the spikelet, membranous, whitish, 5-7-nerved with free nerve-ends; upper corresponding in size and outline to the spikelet, thinly papery, 5- (rarely 7-) nerved, with faint transverse veins in the upper third or quarter, nerves greenish. Lower floret neuter: valve very similar to the upper glume, 5nerved; valvule narrowly oblong, obtuse, with smooth keels, almost as long as the valve or more or less (sometimes much) reduced. Upper floret &, elliptic-oblong, subacute, 1\frac{1}{4} lin. long; valve and valvule crustaceous, finely transversely wrinkled, the former faintly 5-nerved, the latter very finely keeled and the flaps widened and almost contiguous at one-third from the base; anthers $\frac{1}{2}$ lin. Grain elliptic in outline, flat on both sides, 1 lin. by $\frac{1}{2}$ lin., about $\frac{3}{20}$ lin. thick, yellow; embryo-mark very indistinct.

Upper Guinea. Lagos: Dawodu, 163!



22. B. dura, Stapf. Perennial, about $2\frac{1}{2}$ ft. high, compactly cæspitose on a short oblique rhizome with intravaginal innovations. Culms slender, wiry, erect and simple, up to $\frac{1}{2}$ ft., more or less geniculate and branched, terete or slightly compressed, glabrous or sometimes sparingly and minutely hairy below the nodes. Leafsheaths tight, terete or slightly compressed, very firm and hard, striate, the basal up to over 3 in. long, hairy, long-persistent and coating the innovations and flowering culms, the others glabrous; ligules a narrow ciliolate rim; blades narrowly linear, convolute, very wiry, up to over 1 ft. long, 1 lin. wide when flattened out, \frac{1}{2} lin. in diam. in the convolute state, pale green, glabrous except for a beard (lower leaves) or some fine pubescence at the base; blade of the uppermost leaves suppressed, the sheath tapering gradually to an acute point. Inflorescences reduced to a solitary terminal upright straight or slightly arching secund spiciform raceme, 3-4 in. long, simple, dense or somewhat loose, 1-seriate, rarely augmented by a second raceme about $1\frac{1}{2}$ in. below the terminal; rhachis semiterete, flattened upwards, \(\frac{3}{8}\) lin. wide, scabrid or rigidly ciliate along the angles, otherwise glabrous; internodes 2-3 lin. long; pedicels solitary or 2-nate, the longest not much over \frac{1}{2} lin. long, very finely puberulous with discoid tips. Spikelets contiguous or discontiguous, oblong, subobtuse, 2 lin. long, glabrous, pale, sometimes tinged with purple. Glumes unequal, membranous, the lower ovate-oblong, slightly marginate, half as long as the spikelet, 4-nerved; upper corresponding in outline and size to the spikelet or very slightly shorter, 5-nerved with a few obscure cross-veins near the tip. Lower floret 3, as long as the spikelet: valve resembling the upper glume but with the inner side-nerves far apart and depressed along the back; valvule oblong, subacute, 13 lin. long, keels narrowly marginate. Upper floret \(\), broad-oblong, obtuse or obscurely apiculate, as long as the spikelet, pale brown, glossy and smooth; valve and valvule crustaceous; anthers 1 lin. long.

Lower Guinea. Angola: Benguella; country of the Ganguellas and Ambuellas, *Gossweiler*, 2665!

23. B. brizantha, Stapf. Perennial, up to over 6 ft. high from a short sometimes stout rhizome, with stout tomentose root-fibres and extravaginal or intravaginal innovations covered in bud by coriaceous glabrous and often shining or sometimes appressedly hairy cataphylls. Culms erect, rarely geniculately ascending, stout, 4-6- (or sometimes many-) noded, simple or scantily branched, upper internodes exserted. Leaves glabrous or softly hairy to almost velvety; sheaths rather tight, terete, firm, not persisting very long, striate; ligules a narrow fimbriate rim; blades linear or if short sometimes sublanceolate, acute or long-tapering to a slender point, 2-15 in. by 3-8 lin., usually flat, firm, light green, margins cartilaginous and spinulose, nerves numerous and very fine, the primary

lateral more or less distinctly differentiated below, midrik channelled above, somewhat prominent underneath. Inflorescences secund, of 2-8 very rarely solitary distant sessile straight or more often arching or falcate spike-like racemes; common axis 7-1 in. long, triquetrous or semiterete, glabrous, with scabrid or ciliolate rarely setulose angles. Racemes secund, dense, 2 to over 6 in long, sometimes with one or more arrested spikelets at the apex, simple, usually 1-seriate with the spikelets superposed, occasionally partly 2-seriate; rhachis straight or wavy upwards, rather flat or convex on the back, concave on the face, up to over $\frac{1}{2}$ lin. wide, scabrid and loosely ciliate along the angles, cilia rising from small tubercles along the margins, villosulous at the base, internodes 1½-2 lin. long; pedicels solitary, very short, stout, usually sparingly setulose. Spikelets closely contiguous, oblong to elliptic-oblong, rather obtuse or subacute, turgid, 2-3 lin. long, glabrous rarely sparingly hairy upwards, pallid, frequently with purple tops or variously tinged with purple. Glumes very unequal, membranous to subchartaceous; the lower broadovate, obtuse, clasping, half the length of the spikelet or almost so, 7-11-nerved, often purple, glabrous, the upper glume corresponding in outline and size to the spikelet or slightly shorter, very convex, sometimes minutely apiculate, 7-9-nerved, with a few cross-veins near the tip, usually glabrous. Lower floret 3, as long as the spikelet, similar to the lower glume, but flattened or depressed on the back, 5-nerved; valvule oblong, subobtuse, finely keeled, flaps rather broad; anthers $1\frac{1}{2}$ lin. long. Upper floret \heartsuit , equalling the upper glume or as long as the spikelet, oblong in outline, sometimes with a short blunt incurved point, pale or slightly greenish; valve and valvule crustaceous, very delicately pitted, flaps of valvule very broad above the base.—Panicum brizanthum, Hochst, in Flora, 1841, Intell. i. 19 (name only), and ex A. Rich. Tent. Fl. Abyss. ii. 363; Steud. Syn. Pl. Glum. i. 63; Oliv. in Trans. Linn. Soc. xxix. 170, t. 112, fig. 1; Klatt in Jahrb. Hamburg. Wissench. Anstalt. ix. 120; Engl. Hochgebirgsfl. Trop. Afr. 120; Durand & Schinz, Consp. Fl. Afr. v. 742, and Etudes Fl. Congo, 321; K. Schum. in Engl. Pfl. Ost-Afr. C. 101; Rendle in Cat. Afr. Pl. Welw. ii. 168; De Wild. & Durand, Contr. Fl. Congo, i. fasc. ii. 72, and in Bull. Herb. Boiss. 2me sér. i. 60; De Wild. & Durand, Pl. Thonner. 3; Pilg. in Schlechter, Westafr. Kautschuk-Exped. 268; Chiov. in Ann. Istit. Bot. Roma, viii. 304; De Wild. Etudes Fl. Baset Moyen-Congo, ii. 11; Wood, Natal Pl. t. 147; Rendle in Journ. Linn. Soc. Bot. xl. 229; Eyles in Trans. Roy. Soc. S. Afr. v. 299.

Upper Guinea. Southern Nigeria: Ila, 350 ft., Thomas, 1930! Oban, Talbot, 852!

North Central. Upper Oubangui: Fort de Possel, Chevalier, 5364!
Nile Land. Eritrea: Amasen; Mount Savour, 5900 ft., Pappi, 5403.
Cohain; Addi Calina, 5900 ft., Pappi, 2997. Maragus; Adi Mabit, 5250 ft., Pappi, 960. Abyssinia: Gallabat; Matamma, Schweinfurth, 1162! Tigre, Mount Sholoda, 6000-7000 ft., Schimper, 18! 89! Southern Abyssinia; without precise locality, Drake-Brockman! Niamniam country: Nyanje on

1.20 cm

23+ B. Verdickii Robyns aff callofons but infl. and racines smaller, callos scarcely globase,

the Ibba River, Schweinfurth, 3964! Bongoland: Culango, Schweinfurth, 2217! Gir, Schweinfurth, 2503! Uganda; Kizude, 4000 ft., Dummer, 2603! Kipayo, Dummer, 895! 2484! Nandi country: Sibu, James! Umjaro plateau, common, Spēke & Grant! Manjango, Stuhhmann, 1386! Ruwenzori; Kasamagas, 5300 ft., Scott Elliot, 7610! Buddu; Buganga, Scott Elliot, 7461! British East Africa: Nairobi, Miss Johnstone, 59! Dowson, 257! 307! Taita Mountains; Ndoli, Gregory! and without precise locality, Powell, 23!

Lower Guinea. French Congo: Bonga, at the mouth of the Sanga river, Schlechter, 12663. Belgian Congo: Cataracts District; Lutete, Hens, A 214! Stanley Pool District; Kisantu, Gillet, 698, 948. Mokaba, Vanderyst, 3781! Gamboni, Vanderyst, 3674! Ruzizi-Kivu District (Coll.?). Katanga; Chisangwe, Homblé, 49! Elisabethville, Rogers, 10952! Angola: Pungo Andongo; Calunda, Welwitsch, 2713! in damp meadows at the River Cuanza near Mopopo, Welwitsch, 2822! meadows near Sansamanda, Welwitsch,

2796! Benguella; in shrubby pasturage near Monungue, Gossweiler, 3082! Libolo country; Fumbo-Calulo, Gossweiler, 5994!

Mozambique Distr. German East Africa: Kilimanjaro; Himo River 3400 ft., Volkens, 1711! below Matschama, 3000 ft., Volkens, 1573! Portu-3400 ft., Volkens, 1711! below Matschama, 3000 ft., Volkens, 1573! Portuguese East Africa: Quilimane, Stuhlmann! Zinyumbo Hills, 1500 ft., Swynnerton, 1557! Batoka country, Kirk! Nyasaland: between Kondowe and Karonga, 2000–6000 ft., Whyte, 377! Shire Highlands, Adamson, 190! Buchanan, 48! 1437! 1447! Rhodesia: Mumbwa, 15° S., 28° E., Mrs. Macauluy, 38! Broken Hill, Rogers, 7685! Victoria Falls, Rogers, 5669! Bulawayo; Matoppo Hills, Appleton, 21! 22! Matabeleland; Insiza Distr., Mundy! Mashonaland; Umtali, Hon. Mrs. Cecil, 274! Sawer, 32! Salisbury, Mrs. Craster, 29! 35! Eyles, 643! Nobbs, 697! Darling in Herb. Bolus, 10788; Enkeldoorn, Nobbs, 671! Gazaland: North Melsetter, 4000–6000 ft., Swynnerton, 1602 a! Nyahodi River, 4000 ft., Swynnerton, 1673! Chirinda, 3500 ft., Swynnerton, 1622!

24. B. callopus Stapf. Annual, over 2 ft. high, copiously rooting from the lowest nodes. Culms erect, simple, stout, sheathed all along, terete, glabrous, about 7-noded. Leaf-sheaths somewhat loose, rather thin, terete or more or less compressed below, much so upwards and at the same time broadly keeled, the lowest sparingly and finely hairy; ligules a fringe of snow-white hairs; blades erect, linear, passing imperceptibly into the sheath, acute, tightly folded, keeled, with the keel thinning out upwards, up to 8 in. by over 1 lin. (folded), finely hairy on the face at least downwards, otherwise glabrous and delicately papillose, nerves numerous, very close, margins slightly scaberulous. Inflorescences erect, about 6 in. long, of 6-8 erect or suberect secund almost subequally distant racemes; common axis sharply triangular, slightly flexuous, puberulous, scabrid on the angles. Racemes dense, 2-seriate, sessile, 2 in. (the lowest) to $\frac{2}{3}$ in. long, simple; rhachis subtriquetrous, flat on the back, minutely puberulous or scaberulous, with scattered long fine tubercle-based hairs from the angles, internodes about ½ lin. long; pedicels solitary, very short, stout, with or without a stiff long hair. Spikelets contiguous, elliptic in outline, acute, stoutly stipitate, about 2 lin. long, pale straw-coloured. Glumes very unequal, their bases adnate to the stout internode, forming with it a subglobose stipe; lower glume (free part) broad, ovate, membranous, obtuse, 3-5-nerved; upper very convex, corresponding in outline and size to the spikelet, 7-nerved, with nerves scaberulous upwards and with some fine cross-veins, very delicately pubescent. Lower floret as long as the spikelet, \mathcal{J} : valve similar to the upper glume, somewhat flattened on the back, 7-nerved, the inner side-nerves smooth, raised upwards, the intermediate scabrid, the median part of the valve between them smooth, the sides scaberulous; valvule oblong, acuminate, finely keeled, with narrow flaps vanishing upwards; anthers $\frac{7}{8}$ lin. long. Upper floret hermaphrodite, somewhat shorter than the lower, broad, elliptic-oblong, apiculate, $\frac{11}{2}$ lin. long: valve and valvule semicrustaceous, smooth, very delicately striate.— $Panicum \ callopus$, Pilg. in Engl. Jahrb. xxxiii. 46.

Nile Land. Bongoland: Gir, Schweinfurth, 2151!

Horling

25. B. obtusiflora Stapf. Annual, up to 3 ft. high. Culms erect or geniculately ascending, stout, 4-5-noded, simple, glabrous and smooth, upper internodes exserted. Leaf-sheaths rather loose, not very firm, the lower slipping from the culm, glabrous or more or less loosely hairy, hairs fine, from a minute tubercle; ligules quite suppressed; blades linear to lanceolate-linear from an equally wide or constricted and rounded base, tapering to a slender acute point, 3 to over 8 in. by 3-5 lin., flat, pale green or yellowish when dry, loosely and finely hairy or glabrous or becoming so, margins cartilaginous, spinulously scabrid, midrib slender, whitish, prominently so, primary lateral nerves obscure. Inflorescences contracted, 2 to over 6 in. long, erect, narrowly oblong, subsecund, of 5-8 suberect dense and broad spiciform racemes; common axis somewhat stout, triquetrous with scabrid or ciliolate angles or setulose downwards, the keel on the face sharply prominent. Racemes irregularly pluriseriate, compound, $2-\frac{2}{3}$ in. long, 4-5 lin. wide, secund, longer than the internodes, hence more or less contiguous or subimbricate upwards; rhachis subtriquetrous, from over ½ to ¼ lin. wide, straight, angles scabrid or downwards sparingly hairy, internodes 1 lin. long or less; secondary racemes of mostly 3, rarely 4, spikelets, very short and contracted forming fascicles of as many spikelets; pedicels stout, extremely short, with discoid tips, glabrous. Spikelets densely crowded, very turgid, ellipsoid to oblong-ellipsoid, very obtuse, contracted at the base into a stipe \(\frac{1}{4} \) lin. long, about 2 lin. long, pale or yellowish, sometimes variegated with purple, quite glabrous. Glumes very dissimilar; lower rounded, very obtuse, broadly clasping, 5-nerved, nerves not anastomosing, firmly membranous to chartaceous; upper corresponding in outline and size to the spikelet, chartaceous, finely 5-nerved. Lower floret 3, as long as the spikelet: valve very similar to the upper glume, 5-nerved; valvule elliptic, obtuse, almost as long as the valve; anthers $1\frac{1}{4}$ lin. long. Upper floret $\mbox{\ensuremath{\normalfone2.5ex}}$, elliptic-oblong, subobtuse, pale, $1\frac{3}{4}$ lin. long; valve and valvule crustaceous, smooth; anthers slightly over 1 lin. long.—Panicum obtusiflorum, A. Rich. Tent. Fl. Abyss. ii. 367; Steud. Syn. Pl.

> 1857, ... (Rich 1950





Glum. i. 63; Schweinf. Beitr. Fl. Aethiop. 301; Durand & Schinz, Consp. Fl. Afr. v. 757; Chiov. in Ann. Istit. Bot. Roma, viii. 304.

Nile Land. Eritrea: Sarae; by the Mareb River near Gundet, 5570 ft., Pappi, 373. Abyssinia: Gallabat; Matamma, gregarious, Schweinfurth, 1067! 1154! in the swamps of Walcha plain, Schimper, 1553! 1608! Sudan: Khartoum (?), Massey.

The two sheets of Schimper 1608 at Kew and at the British Museum are named *Panicum equitans*, Hochst., on the distribution label, but the Kew sheet represents a species of *Echinochloa*. To judge from A. Richard's and Steudel's descriptions of *Panicum equitans* it is evident that they had an *Echinochloa* before them, and Steudel actually places it in his section *Echinochloa*.

(murro) 26. B. nigropedata, Stapf. Perennial, compactly coespitose, $1-2\frac{1}{9}$ ft. high, on a short oblique rhizome which is densely beset with fascicles of culms and intravaginal innovations coated by the firm basal sheaths. Culms erect, rather slender, glabrous or finely pubescent, about 3-noded, simple, internodes exserted, except the lowest. Leaves mostly crowded at the base; sheaths tight, terete, rather firm, the outer and lowermost densely tomentose, the following gradually less hairy or spreadingly hirsute, the uppermost finely pubescent or glabrous; ligules a fringe of short rigid hairs; blades linear from a narrow base, long-tapering to a fine point, 4-10 in. by $2\frac{1}{2}$ -3 lin., erect, subrigid to flaccid, softly pubescent, sometimes finely hirsute, pale or yellowish-green. Inflorescence up to 5 in. long, subsecund or secund, of 3-8 or sometimes more erect or spreading secund spiciform racemes; common axis semiterete or flattened upwards or adaxillarily channelled in the lower part, pubescent or puberulous, scaberulous along the angles. Racemes simple, very dense, 2-seriate, grevish, 1 (rarely 1½) to ½ in. long; rhachis flattened on the back, with a very slender prominent midrib on the face, up to \(\frac{1}{4}\) lin. wide, puberulous or minutely hirsute, rigidly ciliate along the margins, tomentose at the base, internodes $\frac{1}{2}$ in long; pedicels solitary, very short, stout, setulose with slightly thickened tips. Spikelets closely contiguous, broad or elliptic-oblong in outline, cuspidate, turgid, constricted at the base into a short glabrous black stipe, including it 2 lin. long, pale greenish or grevish, silkily villous. Glumes very unequal, the lower subhyaline, broad, ovate, acute or acuminate, half the length of the spikelet, 3-5-nerved, pubescent. Upper glume membranous, very convex on the back, elliptic, cuspidate, as long as the spikelet, faintly 5-nerved, loosely hairy, the uppermost hairs longer. Lower floret as long as the spikelet, 3: valve equal and similar to the upper glume, hyaline and subglabrous along the depressed back, hairy on the sides with a more or less distinct tuft of longer hairs on each side below the tip, or more evenly hairy; anthers 1 lin. long; valvule elliptic-oblong, subacute with fine keels, flaps broad near the tip, then narrow and wide again at the base. Upper floret broad-oblong, apiculate or minutely mucronulate, nearly 1½ lin. long, white, almost smooth; valve and valvule crustaceous.—Panicum nigropedatum, Munro ex Hiern in Trans. Linn,

Soc. ser. 2, ii. 29; Stapf in Dyer, Fl. Cap. vii. 388; Rendle in Journ. Linn. Soc. Bot. xl. 229; Eyles in Trans. Roy. Soc. S. Afr. v. 300; Heering in Arbeit. Deutsch. Landwirtsch.-Gesellsch. Heft 197, 15. P. melanotylum, Hack. in Engl. Jahrb. xi. 398. P. melanostylum, Durand & Schinz, Consp. Fl. Afr. v. 756.

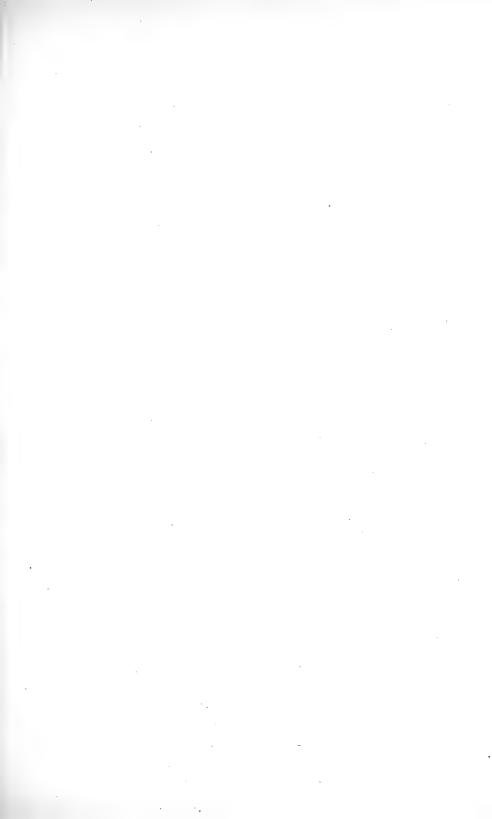
Nile Land. British East Africa: without precise locality, Mrs. Prescott-Decie!

Lower Guinea. Amboland: Ondonga, Rautanen! Otawifontein (according to Heering). Hereroland: Okanakersewa, Dinter, 649! between Harris and the Awas Mountains, on the high plateau, Pearson, 9506! between Choaberib and Gurumanes, Pearson, 9406!

Mozambique Distr. Rhodesia: near the Zambesi, Holub! Mashonaland: Umtali, Hon. Mrs. Cecil, 268! Salisbury, 4900 ft., Eyles, 631! Enkeldoorn, Nobbs, 673! Bechuanaland: Greathead in Colonial Herb. 4083. Bulawayo, Jeffries, 62! Rogers, 5901! Portuguese East Africa: Madanda forcst, 400 ft., Swymmerton, 1558 a!

(Hochsti)

27. B. lachnantha, Stapf. Perennial, compactly exspitose on a short rhizome with intravaginal innovations, $\frac{1}{3}$ 2 ft. high. Culms erect or geniculately ascending, moderately slender, about 2-noded with the uppermost node below the middle, the lower internodes pubescent upwards, otherwise glabrous. Leaves crowded at the base; sheaths tight, the lower firm, finely striate, more or less compressed upwards and villosulous at the nodes, hairy to tomentose at the very base, finely pubescent or glabrescent upwards, longpersistent and coating the barren shoots and flowering culms; ligules a fringe of very short hairs; blades linear from an equally wide or attenuated base, tapering to a fine callous point, 4-7 in. long by $2-2\frac{1}{2}$ lin., flat, pale green or slightly glaucous, somewhat plump, sparingly hairy or glabrous, rarely subhirsute, nerves numerous, the primary lateral indistinctly differentiated, margins very slightly rough upwards. Inflorescence up to 4 in. long, sometimes much reduced and very short, of 5-2 suberect almost equally distant racemes; common axis slender and adaxillarily flattened or channelled, glabrous, scabrid or scaberulous along the angles. Racemes stout, sessile or subsessile, very dense, 2-seriate, simple, up to 1 in. long, silkily villous; rhachis almost straight, somewhat flattened, subtriquetrous, about $\frac{1}{5}$ lin. wide, densely and long-ciliate, the cilia equalling the spikelets; internodes \(\frac{1}{3} \) lin. long; pedicels solitary, ½ to almost 1 lin. long, villous with the hairs over 2 lin. long. Spikelets contiguous, broadly oblong, subacute or shortly acuminate, 2 lin. long, greenish, frequently tinged with purple. Glumes very unequal, thinly membranous, the lower very broadly ovate, ½ lin. long, acute or 2-dentate, pubescent, imperfectly 3-nerved; the upper corresponding in outline and size to the spikelet, finely 5-nerved, loosely villous. Lower floret as long as the spikelet, 3; valve very similar to the upper glume, somewhat flattened on the back with a few delicate cross-veins; valvule ovate-oblong, subacute, about 1½ lin.



27+ B. Wilter Robers aff B. lacherautha but O Congo Belge.

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long; anthers almost $1\frac{1}{2}$ lin. long. Upper floret \mbeta , broad-oblong, obtuse, $1\frac{1}{2}$ lin. long, whitish; valve and valvule thinly crustaceous, almost smooth.—Panicum lachnanthum, Hochst. in Flora, 1855, 195; Durand & Schinz, Consp. Fl. Afr. v. 752; K. Schum. in Engl. Pfl. Ost-Afr. C. 101; Chiov. in Ann. Istit. Bot. Roma, vii. 62, and viii. 300; Engl. Veget.-Verh. Somaliland, 40.

Nile Land. Eritrea: Sarae; Adi Gana, 6200 ft., Pappi, 586. Abyssinia: Samen; Bellaka, 7000 ft., Schimper, 2239! and without precise locality, Schimper, 1210! Ogaden desert, near Mil-Mil, Riva, 260! Somaliland: Golis

Range, Drake-Brockman, 461! (Thurnb.)

Perennial, up to 2 ft. high, more or less 28. B. serrata, Stapf. densely tufted; rhizome short, thick, with stout densely tomentose root-fibres; innovations extravaginal, covered with densely tomentose or villous cataphylls, growing up erect and often closely packed, rarely lengthening out into short stolons. Culms usually erect, terete, rather slender, branched from the base and some of the lower nodes, rarely geniculately ascending; lower and intermediate internodes 4-5, rarely more, wholly enclosed in their sheaths or nearly so, hairy, short or at any rate very much shorter than the long-exserted glabrous uppermost internode. Leaves usually crowded towards the base; sheaths tight, firm, the upper more or less herbaceous, glabrous except near the mouth, along the outer margin and at the villous nodes, or like the lower more or less hairy, the latter often softly and shortly hirsute; ligules a transverse fringe of short hairs; blades linear to lanceolate-linear, long-tapering to a callous point, 1-5 in. by 1\frac{1}{2}-4 lin., flat or convolute, rigid, stout, glabrous or more or less hairy, sometimes densely so, margins cartilaginous, often closely crisped or wavy, minutely spinulose, nerves numerous, slender and close, the midrib and 3-5 primary lateral nerves distinctly differentiated below only if at all. Inflorescence very narrow, of 3-10 subcrect or appressed spike-like racemes; common axis filiform, 3 (rarely more) in. long, more or less semiterete, glabrous or puberulous or pubescent. Racemes usually longer than the internodes, the lowest $\frac{1}{3}$ rarely 1 in. long, the following gradually shorter or all very short, sessile or the lowest shortly peduncled, 2-seriate, simple, rarely with a small secondary raceme at the base, secund; rhachis filiform, triquetrous, up to \frac{1}{8} lin. wide, angular, wavy, pubescent with or without longer fine hairs, internodes about 1/2 lin. long; pedicels solitary or the lower 2-nate, filiform with discoid tips, very short, rarely the longer of a pair over $\frac{1}{2}$ lin. long, pubescent, usually with some long fine hairs upwards. Spikelets laterally contiguous or subimbricate, ovoid-ellipsoid to ellipsoid, shortly subacute and cuspidulate, or obtuse, turgid, $1\frac{1}{4}-1\frac{1}{2}$ lin. long, pallid, overtopped by a purplish tuft of hairs. Glumes very unequal; lower subhyaline, broad-ovate, obtuse, more than half the length of the spikelet, 3-nerved, often dark purple, pubescent; upper glume corresponding in outline and size to the spikelet, very convex, membranous, pale or greenish,

5-nerved, with the nerves quite obscure below the fringe of purplish silky hairs which stretches across the glume below the glabrous tips, pubescent or villosulous below the fringe or glabrous in the centre. Lower floret of: valve equal and similar to the upper glume in size and texture, but more cuspidate or mucronate, hyaline and glabrous along the middle with the transverse fringe broken up into two tufts of hairs; valvule almost as long as the valve, broad-elliptic-oblong; anthers over 1 lin. long. Upper floret $\mbox{\normalfont{$\zeta$}}$, elliptic in outline, subacute or minutely cuspidate, $1-1\frac{1}{3}$ lin. long, pale; valve and valvule coriaceous, glabrous or the former slightly ciliate near the tip, glossy. -Panicum serratum, Spreng. Syst. i. 309; Kunth, Rév. Gram. i. 215, t. 19, and Enum. i. 98; Trin. Pan. Gen. 146, and in Mém. Acad. Pétersb. 6me sér. iii. 233; Nees, Fl. Afr. Austr. 31; Steud. Syn. Pl. Glum. i. 57; Durand & Schinz, Consp. Fl. Afr. v. 765 (includ. var. holosericeum, Hack.); Schum. in Engl. Pfl. Ost-Afr. C. 101 (partly); Stapf in Dyer, Fl. Cap. vii. 388; Eyles in Trans. R. Soc. S. Afr. v. 301. P. serratum, var. holosericeum, Rendle in Journ, Linn. Soc. Bot. xl. 229; Eyles, l.c. P. scopuliferum, Trin. Spec. Gram. Icon. t. 165; Kunth, Enum. i. 99; Durand & Schinz, l.c. 764. P. holosericeum, Nees, l.c.; not of R. Br. Holcus serratus, Thunb. Prodr. 20, and Fl. Cap. ed. Schult. 110. Sorghum serratum, Roem. & Schult. Syst. ii. 839.

Lower Guinea. Angola: country of the Ganguellas and Ambuellas, Gossweiler, 2421!

Mozambique Distr. Nyasaland, Buchanan, 233! 1446! 1450! Shire Highlands, Scott Elliot, 8585! Rhodesia: Salisbury, common in wet places on granite soil, Allen, 696! 699! Mrs. Craster, 20! Sawer, 22! Mashonaland: Inyanga Distr., Mundy! Insiza Distr., Mundy! Charter, Government Herb. 3007. Victoria Falls, Rogers, 7057. Gazaland: Chirinda, 3800 ft., Swynnerton, 1623.

Also in South Africa.

Var. gossyprium, Stapf. Very similar to the typical form, but smaller in all parts, apparently forming dense cushions of leafy branches 3–6 in. high, from which the flowering culms rise for another 6–12 in. Leaf-blades usually \(^3_4\)–2 in. by 1 to almost 2 lin., often almost pungent, with straight rarely slightly wavy finely scaberulous margins, with or without more or less distant and very minute spinules. Inflorescence 1–2 in. long. Spikelets from less than 1 to 1\(^1_4\) lin. long. —Panicum gossypinum, A. Rich. Tent. Fl. Abyss. ii. 366; Steud. Syn. Pl. Glum. i. 56; Schweinf. Beitr. Fl. Aethiop. 300, and in Bull. Herb. Boiss. ii. App. ii. 19, 95; Engl. Hochgebirgsfl. Trop. Afr. 120; Chiov. in Ann. Istit. Bot. Roma, viii. 30. P. serratum, K. Schum. in Engl. Pfl. Ost-Afr. C. 101 (partly). P. serratum, var. gossypinum, Hack. ex Durand and Schinz, Consp. Fl. Afr. v. 765; Chiov. l.c. 299. Eriochloo purpurascens, Hochst. in Flora, 1841, i. Intell. 19.

Nile Land. Eritrea: Assorta; between Minat Lake and the Urug Valley, 4900 ft., Pappi, 3378. Adi Qaieh, in the crevices of sunny rocks, 7550 ft., Schweinfurth, 20! Amasen; arid north slope of Mount Bizen, 6560 ft., Schweinfurth, 2029! Ambelaco near Maldi, 6560 ft., Schweinfurth, 19! Addi Baro, along the Mareb River, Pappi, 2407; Sala Dharo, 7550 ft., Pappi, 2313; Lesa Mountains, Pappi, 4694! Plateau of Asmara, Tellini, 357; Sarae; along the Mareb and in various other localities, between 5570 and 6200 ft., Pappi, 93, 302, 352, 489, 597; Ocule Cusai, 6550–8500 ft., Pappi, 1355, 2436. Abyssinia: Tigre; Mount Sholoda, Schimper, 174! Southern Abyssinia: Abomso, Drake Brockman, 138! Somaliland, Lort-Phillips!

Mozambique Distr. German East Africa: Usambara; Kiva Mahuza, Hotst, 9154 a!





Brachiaria.

This variety is perhaps only an edaphic or climatic modification of typical 29. B. brachylopha, Stary. Perennial, up to 3 ft. high, densely

tufted with intravaginal innovations; root-fibres stout, densely tomentose. Culms usually erect or shortly ascending, simple or very sparingly branched near the base, about 6- or 7-noded, the lower and intermediate internodes enclosed in their sheaths or only shortly exserted, hairy below the nodes, the uppermost by far the longest, very slender, glabrous. Leaf-sheaths tight, striate, moderately firm, the lowest very short, silkily tomentose, the following rapidly increasing in length, softly hirsute; ligules reduced to a fringe of short hairs; blades linear, long-tapering to a slightly callous point, of the lowest and uppermost leaves very short, the others up to 4 in. by $1\frac{1}{2}-2\frac{1}{2}$ lin., flat, rigid, pale or glaucous green, softly hirsute all over, margins cartilaginous, minutely wavy or crisped, with very small rather distant spinules, nerves numerous, close, midrib and about 5 (on each side) lateral primary nerves only slightly differentiated below. Inflorescence very narrow, 3-5 in. long, of up to 12 rather distant subcrect rarely spreading racemes; common axis filiform, subterete to semiterete, angular, glabrous and almost smooth, terminating with a spikelet. Racemes sessile or the lower on finely filiform peduncles (up to 1 lin. long), simple, 2-seriate, dense, silvery white, 6-4 lin. long; rhachis finely filiform, about $\frac{1}{10}$ lin. wide, subtriquetrous, scaberulous, internodes mostly less than ½ lin. long; pedicels solitary, all very short with discoid tips and some long fine hairs below them. Spikelets contiguous or subimbricate, ovoid-oblong or elliptic-oblong in outline, turgid, slightly over 1½ lin. long, silvery-silky. Glumes very unequal; lower broad-ovate to rotundate, obtuse, hyaline, 3-nerved, pubescent, about half the length of the spikelet or almost so; upper corresponding to the spikelet in size and outline, very concave, with a transverse fringe of silvery hairs slightly exceeding the delicate shortly acute or cuspidulate tips, pubescent below them, 5-nerved, the nerves quite obscure below the fringe, more distinct (at least the 3 inner) above it. Lower floret 3: valve resembling the upper glume but more cuspidate, grooved along the middle and there hyaline and glabrous, the bulging sides pubescent, each with a short transverse fringe of hairs corresponding to that of the upper glume; valvule elliptic-oblong, acute; anthers \(\frac{1}{2}\) lin. long. Upper floret \(\preceq\), elliptic-oblong, acute or apiculate, 1-1\frac{1}{4} lin. long, whitish; valve and valvule thinly crustaceous, finely granulate, pubescent along the narrow inflexed margin.—Panicum brachylophum, Stapf ex Cheval. Sudania, 13 (name).

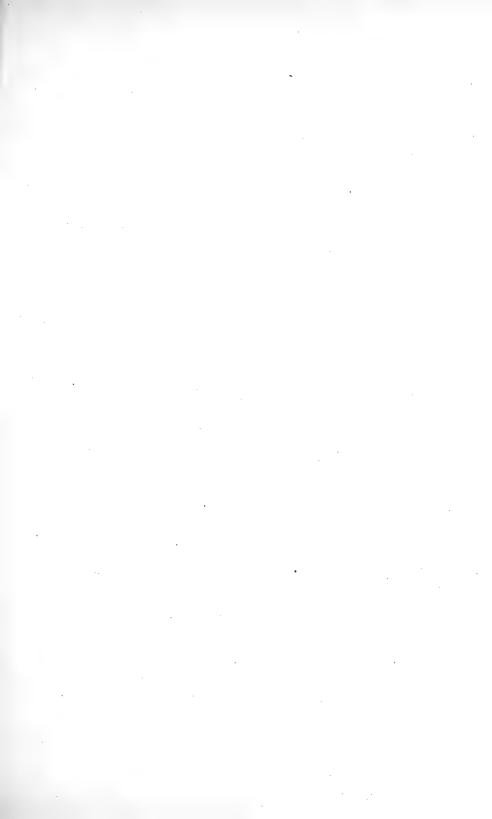
Upper Guinea. French Sudan: Upper Niger near Ouassana, Chevalier, 619! Ivory Coast: Dabou, in savannahs, Chevalier, 17148! Northern Nigeria: Lokoja, Richardson! Nupe; on hills and in dry open plains, Barter, 1397!

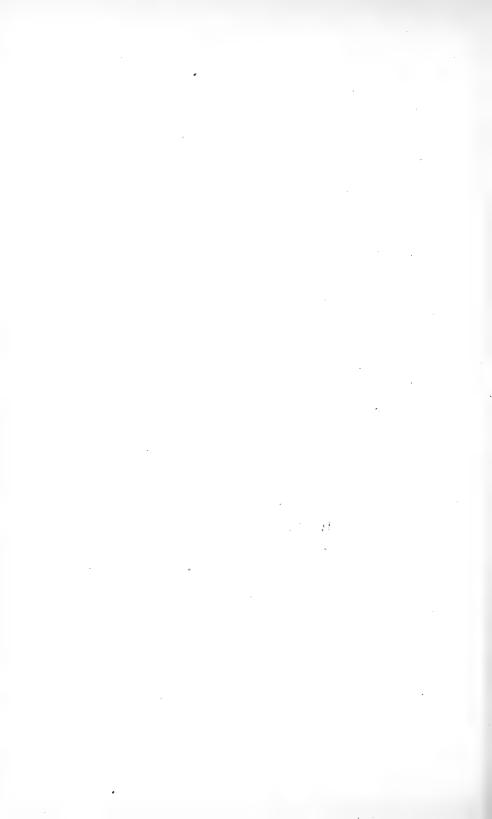
(mez) 30. B. arida, Stapf. Perennial, about 1½ ft. high, glaucous. Culms tufted on a short rhizome with rather stout root-fibres; innovationbuds ovoid, glabrous. Culms geniculate, suberect, few-noded, branched below, the uppermost internode by far the longest, lower internodes slightly compressed and wiry, all quite glabrous and smooth. Leaf-sheaths quite glabrous or sparingly hairy upwards; the basal very pale, slipping off the culms, slightly keeled; ligules thinly membranous, very short, truncate, ciliate; blades narrowly linear from an equally wide base, tapering to a long fine point, 2-8 in. by 1-3 lin., rather rigid, flat or convolute, glabrous or sometimes finely pubescent at the junction with the sheath, smooth except at the minutely scaberulous margin. Inflorescence very narrow, $5-1\frac{1}{2}$ in. long, of 5-2 distant erect or oblique solitary rather stiff and loose racemes or reduced to a single raceme; common axis very slender, angular, smooth or scabrid upwards and often sparingly hairy near the nodes. Racemes simple, up to almost $1\frac{1}{2}$ in. long, the upper much shorter and very scanty, very shortly peduncled or more often sessile; rhachis triquetrous, about $\frac{3}{20}$ lin. wide, glabrous or with a few hairs near the nodes, angles scabrid; pedicels 2-nate, very unequal, the longer $1\frac{1}{2}$ lin. long, or solitary and then up to 2 lin. long, all angular, scaberulous, with or without a few fine tubercle-based hairs. Spikelets oblong, subacute, slightly convex on the back, up to 2 lin. long, pale green, sometimes slightly flushed with red, glabrous. Glumes very unequal; lower broad-ovate, acute, about one-third the length of the spikelet, membranous, 1- to sub-3-nerved; upper corresponding in size and outline to the spikelet, thinly papery, 7-nerved. Lower floret 3: valve very similar to the upper glume, 5-nerved; valvule almost as long as the valve, obtuse, keels narrowly winged; anthers $\frac{9}{10}$ lin. long. Upper floret \circlearrowleft , oblong, slightly wider upwards, obtuse, over $1\frac{1}{2}$ lin. long, smooth; valve and valvule subcrustaceous.—Panicum aridum, Mez in Engl. Jahrb. xxxiv. 139.

Nile Land. Somaliland, Hildebrandt, 1483. Socotra: Wadi Digal, 650 ft., Schweinfurth, 539! Kischen, 2100 ft., Schweinfurth, 584!

(K.Schum.)

31. B. leucacrantha, Stapf. Annual, $\frac{1}{2}$ to over 1 ft. high, loosely tufted. Culms geniculately ascending, slender, terete or subangular below, up to 8-noded, branched, lower and intermediate internodes enclosed, or bared by the slipping off of the sheaths, more or less pubescent, the uppermost at length exserted and glabrous. Leaf-sheaths rather loose, thin, striate, pubescent or softly hirsute, the uppermost and those of young leafy shoots tight; ligules a dense fringe of short hairs; blades linear, slightly narrower downwards, tapering to an acute point, $2-2\frac{1}{2}$ in. by $2-2\frac{1}{2}$ lin., flat, slightly succulent, densely and softly pubescent on both sides, margins scabrid, nerves numerous, fine, close, the primary lateral like the midrib distinguishable below only. Inflorescence of 3-5 distant at length more or less





horizontal secund spiciform racemes; common axis very slender, semiterete, channelled adaxillarily or flattened upwards, up to 2 in. long, scaberulous along the angles, at least upwards, glabrous. Racemes up to almost 1 (rarely $1\frac{1}{2}$) in. long, 1- or sub-2-seriate, simple, moderately dense or loose, sessile or the lowest bare at the base with arrested spikelets; rhachis triquetrous, $\frac{1}{5} - \frac{1}{3}$ lin. wide, straight or slightly wavy, flat on the back, scabrid along the angles, otherwise glabrous or pubescent with or without some fine long hairs; internodes $1-1\frac{1}{2}$, rarely 2 lin. long; pedicels solitary, up to over $\frac{1}{2}$ lin. long, angular, scabrid, often with a few long fine hairs, tips not Spikelets discontiguous, ovate- or oblong-lanceolate, rostrate-acuminate, somewhat turgid, 2 lin. long, whitish. Glumes very unequal; lower broad- to rotundate-ovate, shortly acute, clasping, almost half the length of the spikelet, hyaline, nerves 7-9, fine, anastomosing upwards; upper corresponding in outline and size to the spikelet, whitish with 5 nerves which are green and prominent upwards and connected there by cross-veins, mucronate, glabrous or sparingly pubescent, always with a tuft of stiff erect hairs on each side at three-quarters from the base. Lower floret neuter: valve very similar to the upper glume, but depressed on both sides of the midnerve; valvule elliptic-oblong, 1½ lin. long, with finely scaberulous narrowly winged keels; lodicules 0. Upper floret \(\), broad-oblong, acute, slightly over 1\(\) lin. long, strawcoloured; valve and valvule crustaceous, delicately pitted, flaps of the latter almost touching downwards. Stigmas blackish-purple, exserted below the tip.—Panicum leucacranthum, K. Schum, in Engl. Pfl. Ost-Afr. C. 102.

Nile Land. British East Africa: Makindu, Linton, 102! Rabai, 400 ft., Dowson, 15!

Mozambique Distr. German East Africa: Tanga, in clearings, Holst, 2097! Sacleux, 2567! Amboni, in bush, Holst, 2805!

(Hack.) 32. B. xantholeuca, Stapf. Annual, up to over 2 ft. high, leosely tufted. Culms geniculately ascending or decumbent and rooting at the base, more rarely erect, slender, terete or somewhat compressed towards the base, few- to about 8-noded, branched, rarely quite simple, lower internodes often arching and bared by the slipping off of the sheaths, usually rather short, the uppermost at length long-exserted and much the longest, all softly hairy at least upwards. Leaf-sheaths striate, lower loose, upper somewhat tight, more or less softly hairy to subtomentose or villous, hairs fine, spreading, often rather long, nodes villosulous; ligules a dense fringe of short hairs; blades lanceolate-linear to linear from a slightly and shortly contracted base, tapering to a callous acute or subacute point, 12-4 in. by 2½-4 lin., flat, somewhat succulent and rigid or subflaccid when long, drying yellowish-green, softly pubescent to tomentose or velvety on both sides, with some long and fine hairs here and there,

margins finely cartilaginous, very scabrid, nerves very inconspicuous, primary laterals about 3-4 on each side, distinguishable only below. if at all. Inflorescence secund or subsecund, $1\frac{1}{2}$ -4 in. long of 3-8 stiff suberect or spreading sessile or subsessile spiciform racemes; all the axes very angular, very scabrid along the angles and frequently pubescent, the common axis often channelled adaxillarily. Racemes $\frac{3}{4}$ - $1\frac{1}{9}$ in, long, gradually decreasing upwards, 2-seriate, simple, rather dense or the lowest sometimes looser and interrupted towards the base; rhachis triquetrous, $\frac{1}{4}$ lin. wide, flat or subconvex on the back, straight or very slightly wavy, more or less irregularly ciliate with white hairs, internodes $\frac{1}{2}$ lin. long; pedicels solitary and very short, very rarely 2-nate and then the longer up to 2 lin. long, with fine long hairs near the tips which are not discoid. Spikelets contiguous to subimbricate, ovate to oblong-elliptic in outline, shortly cuspidate to rostrate-acuminate, somewhat turgid, 1; to over 2 lin. long, pale green, hairy, rarely glabrous. Glumes very unequal; lower broad-ovate, shortly acute or acuminate, clasping, half the length of the spikelet, thinly membranous, 7-nerved, nerves anastomosing upwards, prominulous: upper corresponding in outline and size to the spikelet, rather thin below, whitish, 5-nerved, with the nerves converging and passing into a solid cusp or mucro, reticulately cross-veined towards the tip, usually finely and sparingly pubescent below, more densely so upwards where the hairs are at the same time longer and more white, rarely quite glabrous. Lower floret neuter: valve very similar to the upper glume, slightly flattened or depressed on the back; valvule oblong, acute or subobtuse, thin, with marginate keels, almost as long as the valve or more or less reduced; lodicules 0. Upper floret \(\xi \), elliptic-oblong, apiculate to submucronulate, very convex on the back, almost as long as the spikelet, pale straw-coloured; valve and valvule crustaceous, very delicately pitted, glossy, flaps of the latter wide, touching downwards. Anthers orange-coloured, over $\frac{1}{2}$ to almost $\frac{3}{4}$ lin. long. blackish-purple, conspicuous, exserted below the tip of the spikelet. Grain (not quite mature) subellipsoid, dorsally slightly compressed, greenish; scutellum panduriform, half the length of the grain; hilum narrowly oblong.—Panicum xantholeucum, Hack. in Verhandl. Bot. Ver. Brandenb. xxx. 141; Durand & Schinz, Consp. Fl. Afr. v. 767; Hack. in Bull. Herb. Boiss. iv. App. iii. 15; Cheval. Sudania, 159.

Northern Nigeria: Nupe; on cultivated ground, Barter, Upper Guinea. 799! 1366! Sokoto, *Dalziel*, 476! 476a! **North Central.** Bagirmi: Nigui, *Chevalier*, 9459!

Amboland: Olukonda, Schinz, 639! Hereroland: Onjodja-Lower Guinea. here, Schinz, 474!

33. B. ramosa, Stapf. Annual, up to over 2 ft. high. Culms fascicled, slender, geniculate, subcrect or more usually ascending from a frequently prostrate and rooting base, terete, $4-\infty$ -noded,





branched below, glabrous or softly and finely pubescent upwards. Leaf-sheaths somewhat thin, the lower loose and often slipping off the culm, finely striate, glabrous, with only a few marginal or submarginal cilia towards the mouth, to finely pubescent all over or at least upwards; ligules reduced to a line of short white hairs; blades linear-lanceolate from a rounded and often clasping base, long and finely acuminate, from less than 2 to 5 (occasionally 6) in. by 3-8 (occasionally 12) lin., flat, soft and usually flaccid, green, glabrous or finely pubescent on the back near the base or all over, margins sharply scabrid, primary lateral nerves 3-5 on each side with numerous very fine secondary ones between them, midrib slender. Panicle at length usually more or less exserted, narrowly oblong, 2-6 in. long, of 5 to many solitary downwards somewhat distant, upwards approximate or altogether irregularly approximate suberect or oblique spike-like racemes; common axis angular, channelled on the adaxillary side, terminating with a spikelet, scabrid along the edges of the channel, glabrous or very finely pubescent and sometimes here and there with longer hairs. Racemes moderately slender, the lower $1\frac{1}{2}-2\frac{1}{2}$ in. long, the upper gradually shorter, straight or slightly flexuous, subsessile or the lowest shortly peduncled, simple or the longer frequently compound downwards or up to or beyond the middle, with very short secondary racemes; rhachis triquetrous, slightly wavy to straight, rarely over \(\frac{1}{4}\) lin. wide, scabrid along the angles, otherwise glabrous or very finely pubescent, with or without scattered long hairs; pedicels paired or fascicled (contracted secondary racemes) or upwards solitary, filiform, angular, scabrid, the longest of a pair or fascicle up to 1 lin. long, frequently with some long rigid hairs from near the tips. Spikelets (or pairs or clusters of spikelets) evenly distant by slightly less than their own length or sometimes irregularly approximate or rather remote downwards, ovoid, subacute or apiculate, somewhat turgid, 1½ lin. long, greenish, at length pale straw-coloured. Glumes very unequal; the lower broad-ovate, obtuse to subacute, clasping at the base, 5-7- (rarely 3-) nerved, the inner or all nerves anastomosing; upper corresponding in shape and size to the spikelet, membranous, glabrous or finely pubescent, 7- (more rarely 5-) nerved, nerves distinct, green. Lower floret neuter: valve very similar to the upper glume, 5-nerved; valvule oblong, truncate, delicate, more or less reduced. Upper floret &, slightly shorter than the lower, ovate in outline, subacute, pale brown when mature; valve and valvule crustaceous, transversely rugose. Grain broad-elliptic in outline, flat or slightly depressed on both sides with broad rounded sides, up to 1 lin. by $\frac{8}{10}$ lin.; scutellum ovate-oblong, equalling $\frac{2}{3}$ of the grain.—Panicum ramosum, Linn. Mant. i. 29; Kunth, Enum. i. 125; Steud. Syn. Pl. Glum. i. 97; Hook. f. Fl. Brit. Ind. vii. 36 (partly) (glabrous state); Hitchcock in Contrib. U.S. Nat. Herb. xv. 44. P. arvense, Kunth, Rév. Gram. i. 391, t. 109, and Enum.

i. 93; Steud. l.e. 67; Durand & Schinz, Consp. Fl. Afr. v. 741; Hack. in Bolet. Soc. Brot. iii. (1884) 135 (pubescent state). *P. Petiveri*, Trin. Diss. ii. (Gram. Pan.) 144 (partly); Pan. Gen. 171, and Sp. Gram. Ic. t. 176 A, B; Nees, Agrost. Bras. 1113 Kunth, Enum. i. 91; Steud. l.c. 68; Baker, Fl. Maurit. 434 (pubescent state). *P. brachylachnum*, Steud. l.c. 62. *P. cognatissimum*, Steud. l.c. 69; Durand & Schinz, l.c. 742. *P. patens*, Boj. Hort. Maur. 365, not of Linn., and *P. pygmæum*, Boj. l.c. (pubescent states).

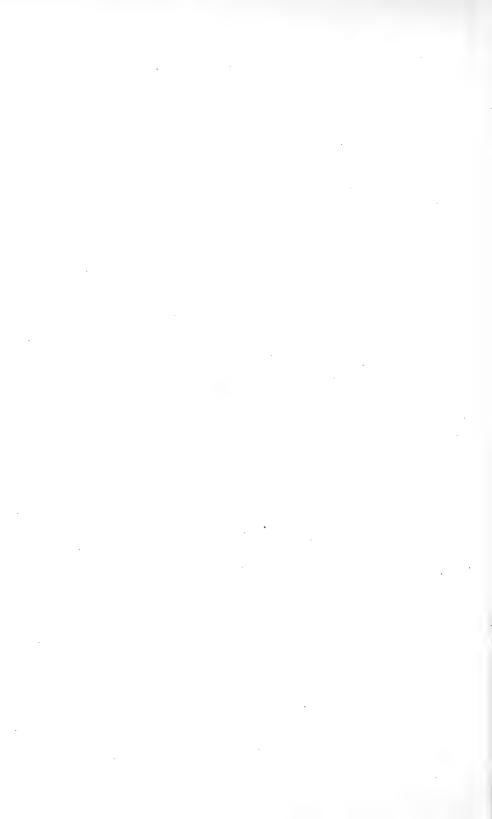
Upper Guinea. Cape Verd Islands: St. Vincent, Cunningham! St. Jago; Os Orgãos, Lowe! Chão de Falcâo, Lowe! and without precise locality, Wilkes' Expedition, 3! Fogo; Sta Filippe, Lowe! Brava, near the Port, Lowe! Senegal: Richard Toll and Dakka, Roger, 34! and without precise locality, Roger, xvii. partly! Lepricur! Heudelot, 297! Perrottet, 962! Portuguese Guinea: Bolama, Carvalho!

This occurs in a glabrous and a pubescent state. The original specimen in Linnæus' herbarium represents the former. The pubescence, if present, extends generally to the culms, the leaves, the axes of the inflorescences and the spikelets, the upper glume and lower valve. On the blades it may be scanty and disappear with age. It does not seem to be correlated with any other character and the area of the glabrous and pubescent states overlap completely, in fact both have been taken in the same collecting. A curious modification in which the lower valve is more firmly membranous to crustaceous and faintly transversely rugose and thus more or less resembles the upper (fertile) valve—not the upper glume as is normally the case—has been collected in West Africa as well as in India. In that case it is always glabrous and accompanied by a valvule of the reduced kind found normally in the lower floret. Another abnormality is exhibited by specimens collected by Lowe in St. Jago, Cape Verd Islands (glabrous state), and by C. B. Clarke, who described it as a distinct species, P, supervacuum, in Journ Linn. Soc. Bot. xxiv. 407, in Bengal (pubescent state). In these a second barren floret is intercalated between the normal barren and the fertile floret; it is like the former in shape, but intermediate in substance between its neighbours. Owing to this addition the orientation of the fertile floret is that of the lower glume.

(nees) 34. B. regularis, Stapf. Annual, rarely much over $1\frac{1}{2}$ ft. high. Culms fascicled, slender, erect or suberect, more rarely ascending from a geniculate base, terete, rarely more than 4-noded, branched, with the branches subcrect and leafy, but at length all flowering, finely pubescent, at least towards the panicle. Leaf-sheaths somewhat firm, striate, very pale, delicately pubescent all over or at least upwards; ligules a fringe of short stiff hairs; blades linear to sublanceolate-linear from a rounded rarely clasping base, long-tapering to a slender point, from less than 2 to 6 (rarely over 8) in. by 2-6 (rarely 8) lin., flat, subflaccid, often glaucous, finely pubescent, margins scabrid, primary lateral nerves 4-6 on each side with numerous very fine secondary ones between them, midrib slender. Panicle at length more or less exserted, oblong to broad-ovate in outline, 4-6 in. by 3-5 in., sometimes much reduced, of 5 to many solitary or subgeminate at length much spreading or horizontal very lax racemes; common axis angular, slightly channelled on the adaxillary side, terminating with a spikelet, finely scabrid along the angles and sometimes spreadingly hairy besides; racemes slender,

34 = B. deflesa (Schum) Hubb. in Robyns Parisum deflexim Schum 1827.

Estango in Career in



the lower and intermediate $2\frac{1}{2}-1\frac{1}{2}$ or, in robust specimens, to 5 in. long, straight or flexuous, subsessile or the lowest bare at the base for 1-1 in. (owing to the arrest of the spikelets), simple or the longer compound with scanty secondary racemes $\frac{1}{2} - \frac{3}{4}$ in. long; rhachis triquetrous, more or less flexuous to almost straight, $\frac{1}{5}$ lin. wide, scabrid along the angles, finely pubescent with or without scattered spreading hairs; pedicels paired or upwards solitary, filiform, angular, scabrid, the longer of a pair up to 3 or sometimes 5 and even up to 10 lin. long, with or without a few spreading hairs near the tips. Spikelets or pairs of spikelets or secondary racemes distant by 5-8 lin., hence usually very loosely scattered; spikelets as in B. ramosa, but mostly pubescent, the lower glume 5-nerved with all the nerves anastomosing, or sub-7-nerved, the upper glume typically 7-, and the lower valve typically 5-nerved. Lower floret very rarely 3, with anthers 1 lin. long. Anthers of upper floret \(\frac{3}{4} \) lin. long. Grain as in B. ramosa.—Panicum regulare, Nees, Fl. Afr. Austr. 41 (in note); Steud. Syn. Pl. Glum. i. 68; Durand & Schinz, Consp. Fl. Afr. v. 761. P. nudiglume, Hochst. in Flora, 1844, 253; A. Rich. Tent. Fl. Abyss. ii. 372 (partly) including var. major, Hochst.; Walp. Ann. Bot. iii. 717; Steud. Syn. Pl. Glum. i. 68; Schweinf. Beitr. Fl. Aethiop. 301; Martelli, Fl. Bogos, 91; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 21; Durand & Schinz, Consp. Fl. Afr. v. 756; Chiov. in Ann. Istit. Bot. Roma, vii. 64, and viii. 33; Rendle in Cat. Afr. Pl. Welw. ii. 170 (excl. var. major), and in Journ. Linn. Soc. Bot. xl. 229. P. Ruprechtii, Fenzl ex Steud. l.c. P. Petiveri, Balf. f. Bot. Socotra, 310; Durand & Schinz, I.c. 759 (partly); Penzig in Atti Bot. Congr. Genoa, 1893, 366; Chiov. l.c. viii. 32, 302 (includ. vars.); Engl. Vegetat. Somaliland, 14. P. Petiveri, var. nudiglumis, K. Schum. in Engl. Pfl. Ost-Afr. C. 102; not of Trin. P. ramosum, Cheval. Sudania, 34, 162; Eyles in Trans. Roy. Soc. S. Afr. v. 300; not of Linn. P. nidulans, Mez in Engl. Jahrb. xxxiv. 136. Solar

Upper Guinea. French Sudan: Middle Niger; Sompi, Chevalier, 2282! Goundam, Chevalier, 2283! Gold Coast: Aburi, in gardens, Johnson, 1004! in dry plains, Brown, 327! Southern Nigeria: Lagos, MacGregor, 70! Foster, 6! Northern Nigeria: Nupe, in shady ravines, Barter, 1367, B!

North Central. Bagirmi: Arahil, Chevalier, 9606! Central Shari: Jro

Koulfa, Chevalier, 8810!

Nile Land. Nubia: shore of the Red Sea at Mirza Elei (22° 12′ N. long.), Schweinfurth, 1171! Wadi Dimehadit, between Suakim and Berber, Schweinfurth, 446! Sudan: Cordofan, Kotschy, 53! Pfund, 536! Darfur: Surutj District, Pfund, 531! Semaar; near Dakhlia Shellel, Broun, 726! Eritrea: Habab, Hiddebrandt, 339! Beni Amer; Mount Damba, Pappi, 5933! 6031. Begos; Keren, Beccari, 229. Mensa, 1300–1450 ft., Terracciano & Pappi, 2057, 2081. Samhar; Saati, Schweinfurth, 16! Schweinfurth & Riva, 311! Penzig, Ragazzi & Pappi, 2640. Terracciano & Pappi, 2642! Dahlak Archipelago, Tellini, 61. Assaorta; Mount Ghedem, Schweinfurth & Riva, 127! Tellini, 192. Mount Dijot, 5900 ft., Pappi, 5700. Mount Urug, 8350 ft., Pappi, 3418! 3411; and other localities, Pappi, 2631, 2636, 2638, 2639, 3068; Terracciano, 2641. Tellini, 22. Amasen; near Ghinda, 2950 ft., Schweinfurth, 1714! Pappi, 4183; plains of Sabarguma, Pappi, 4006! and other localities, Tellini, 742, 1036, 1398, 1402, 1588; Terracciano & Pappi,

113. Dembelos, Pappi, 6061. Ocule Cusai, 5250 ft., Pappi, 1809, 3995. Damveita; Hotha Islands, Terracciano, 810, 811. Um Namus Island, Terracciano, 430. Abyssinia: Tigré; Hamedo plains, 4600 ft., Schimper, 1074! 1088! Samen; Tacazze Valley, Schimper, 1513! 1653! and without precise Iocality, Schimper, 269! South Abyssinia; Hamara on the Gonale River, Riva, 1195! and without precise locality, Drake-Brockman, 65! British Somaliland: without precise locality, Drake-Brockman, 414! Italian Somaliland; Jub Valley, Erlanger. Socotra, Balfour, 23! 51! 67! 127! of Tamaria, Schweinfurth, 429!

Lower Guinea. Angola: Loanda; gregarious, appearing after the rains, Gossweiler, 1655! 1667! in poor pasture, Welwitsch, 7467! 7362 partly! Golungo Alto (?), Welwitsch, 7217! 7239e! Dondo, Mechow, 2! 2367! Mossamedes; common undergrowth in open bush at km. 107 of the Mossa-

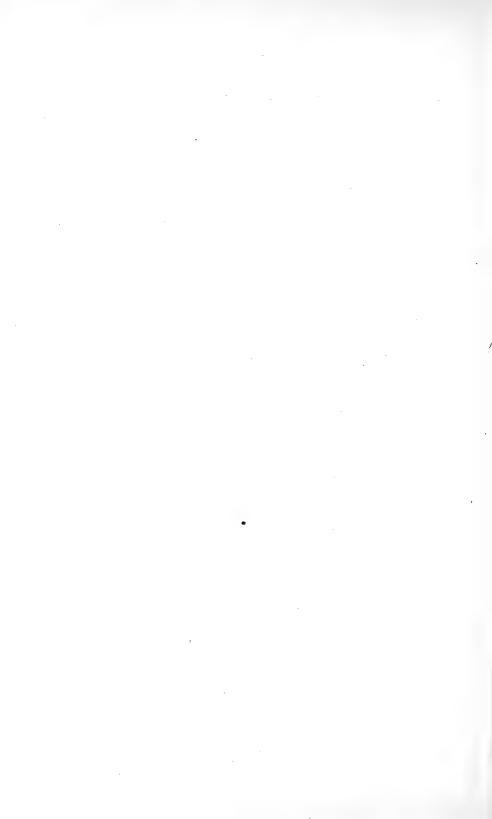
medes railway, Pearson, 2901! Damaraland, Een!
Mozambique Distr. Zanzibar, Hildebrandt, 1086! Belligny! Last! German East Africa: Tanga Station, Holst, 2011! Ukambani; Kibwesi, in grassland and laterite, Scheffler, 523 partly! Nyasaland: Milauri, among taller grasses not far from the Shire, Scott! Portuguese East Africa: Senna, Carvalho! Tette, Kirk! Muchukwana on the lower Buzi, Swynnerton, 997! Rhodesia: Victoria Falls, Rogers, 5720! 6006!

Also in Yemen, N.-E. Transvaal (Shilouvane, Junod, 123!) and Madagasear.

Panicum nidulans, Mez, described from specimens collected by Schweinfurth on the shore at Mirza Elei, south of Elei Island (Nubia), and others collected by Ehrenberg (probably in Eritrea), is apparently merely a very hairy much stunted and contracted desert condition of B. regularis. Schweinfurth's specimens much resemble in general habit certain specimens of the pubescent form of B. ramosa from N. W. India, but as B. regularis seems to be common in Nubia and Eritrea whilst typical B. ramosa appears to be absent there, we may be justified in connecting P. nidulans with the former; some of the primary pedicels are actually more elongated than one would expect from B. ramosa. A similar contracted dwarf state is represented by Broun's specimen from Dakhlia Shellel, Sennar, and other approaches towards it are found among the Socotran specimens, of which Balfour says, "A very variable species, sometimes dwarf, from other localities a large stout plant." The taller Socotran specimens are undoubtedly *B. regularis*, and are clearly connected with the dwarf states. A similar variation, evidently due to conditions of nutrition, is exhibited by Rogers' specimens from the Victoria Falls (no. 5720, tall; no. 6006, stunted). No specimens referable to B. regularis. have been seen in Indian collections; but as far as it goes Trinius' figure C in Sp. Gram. Ic. t. 176 (P. Petiveri) seems to represent it.

Chiovenda (l.c. viii, 32) based a "var. robustissimum" of Panicum Petiveri on Pappi 3418 from Mount Urug. He says it has the habit of P. maximum, with very robust, pubescent culms, a large panicle with the lowest branches in whorls of 5-7 and densely pubescent spikelets. A specimen of Pappi 3418 in the Zürich Herbarium did not strike me as different from *B. regularis* as understood here. Chiovenda also quotes typical P. Petiveri from the same locality and collected on the same date (no. 3411).

35. B. ovalis, Stapf. Annual, fascicled, up to over 1 ft. high. Culms erect or geniculately ascending, about 4-noded, branched below (sometimes copiously), pubescent below the nodes, terete or compressed below. Leaf-sheaths thin, rather loose, striate, softly pubescent all over; ligule a dense fringe of short hairs; blades linear from an equally wide base, long-tapering to a fine point, 3-7 in. by 2-3 lin., flat, flaccid, pale green, very finely and softly pubescent all over, margins finely cartilaginous, scabrid, not crisped, midrib Schriefer 1088 Teall Pour Sommer Commence



very slender, whitish, primary lateral nerves about 4 on each side, very fine, differentiated below only. Panicle narrow, 2-3 in. long, subsecund, of 5-8 very lax subservet or spreading ultimately deflexed subsessile or sessile racemes; common axis slender, angular, loosely pubescent with some longer hairs intermixed. Racemes simple, secund or subsecund, the lower up to \(\frac{3}{4} \) or more rarely 1 in, long, the upper rapidly decreasing and reduced to 4-2-nate or solitary spikelets which arrange themselves in a terminal raceme; rhachis flexuous, filiform, triquetrous, up to $\frac{1}{6}$ lin, wide, pubescent with some longer hairs intermixed, internodes 13-4 lin. long; lowermost pedicels 2-nate, the others solitary and short, the longer of a pair rarely up to 2 lin. long, angular, puberulous, with long hairs upwards. Spikelets distant, broadly ovate or elliptic-oblong, obtuse to subobtuse, 15 to 2 lin. long, whitish and more or less glossy, almost like ivory. Glumes dissimilar; lower very broadly obovate, subacute, usually contracted at the base into a deeply folded or puckered cuft which tightly clasps the internode between the glumes, very white, faintly 3-5-nerved; upper very obtuse, broad, very slightly shorter than the lower floret, thinly papery, 5-nerved, nerves greenish, sometimes vanishing downwards. Lower floret of (? always): valve similar to the upper glume, but somewhat narrower upwards to obscurely apiculate, tip stouter; valvule oblong, truncate with narrow flaps, shorter than the valve; anthers \(\frac{2}{3}\) lin. long. Upper floret \(\beta\), broad-elliptic in outline, subacute, $1\frac{1}{4}$ to over $1\frac{1}{2}$ lin. long, shortly constricted at the base: valve and valvule crustaceous, smooth, at length brownish. Grain broad-elliptic in outline, dorsally compressed, over 1 lin by \(\frac{3}{4}\) lin. greenish-yellow; scutellum about three-quarters the length of the grain, ovate-lanceolate to almost panduriform.—Panicum ovale, R. Br. in Salt, Voy. Abyss. App. iv. 63 (name); Durand & Schinz, Consp. Fl. Afr. v. 758.

Nile Land. Eritrea: Habab; in woods along streams, Hildebrandt, 337! Abyssinia: without precise locality, Salt! British Somaliland: Haud Thomson! Bohotle and Upper Sheikh, Appleton!

Considered to be good fodder (Appleton).

36. B. grossa, Stapf. Annual, up to over $1\frac{1}{2}$ ft. high. Culms fascicled or single, suberect from a geniculate base or erect, slender, terete, glabrous and very smooth, about 5-noded, branched from the base or above it, with the lowest 1 or 2 internodes elongated (2–5 in.), and the branches suberect or obliquely spreading. Leaf-sheaths rather thin, striate, often slipping off the internodes, pale or the upper subherbaceous, quite glabrous or with long fine spreading tubercle-based hairs; ligules a fringe of short white hairs; blades linear to sublanceolate-linear from a more or less rounded base, long-tapering to a fine point, 3–6 in. by 2–3½ lin., flat, thin, green or slightly glaucous, quite glabrous or with a few spreading marginal hairs at the very base, margins scaberulous, primary lateral

nerves 3-4 on each side with numerous very fine secondary ones between them, midrib slender, rather prominent downwards on the back. Panicle at length more or less exserted, broad-ovate in outline, 3-6 in. by 2-5 in., of 4-6 solitary at length much spreading very lax racemes; common axis slender, terete below, more or less flattened upwards with scabrid angles, glabrous, terminating with a spikelet; racemes slender, the lower and intermediate 4-2 in. long, at length rather stiff, sessile, simple or the longest compound downwards with scanty secondary racemes up to over 1 in. long; rhachis very slightly wavy, triquetrous, or rounded downwards on the back, up to $\frac{1}{5}$ lin. wide, scabrid along the angles, glabrous; pedicels paired or upwards solitary, filiform, angular, scaberulous, glabrous or rarely with a few fine long spreading hairs. Spikelets or pairs of spikelets or secondary racemes distant by 4-10 lin., or the lowest by almost 1 in., hence very loosely scattered; spikelets obovoid-oblong, subobtuse or apiculate, turgid, distinctly narrowed at the base, 3-2 lin. long, rather green and quite glabrous, very similar in structure to those of B. ramosa and B. regularis, but the lower glume slightly larger, usually very acute and frequently 3-nerved or sub-5-nerved (with the outer side-nerves very short), the valvule of the barren floret more developed with distinctly winged keels and the valve and valvule of the fertile floret coriaceous-crustaceous and strongly (often acutely) transversely rugose, at length turning dull brown.— Panicum nudiglume, var. major, Rendle, Cat. Afr. Pl. Welw. ii. 170. P. serræfolium, Rendle, l.c.; not of Hochst. ex A. Rich.

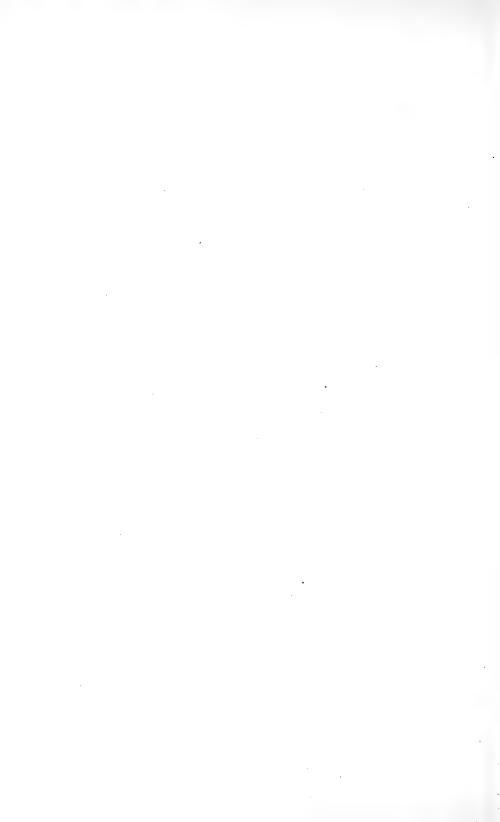
Lower Guinea. Angola: Loanda, Gossweiler, 191! Welwitsch, 7362c partly! 7469! Benguella; Country of the Ganguellas and Ambuellas, Gossweiler, 1652! 1667! Mossamedes; common in undergrowth of open bush at km. 107 of the Mossamedes railway, Pearson, 2367! Among granite blocks between Gambos Fort and the Mission Station, Pearson, 2514! In rock fissures, Pearson, 2440!

Recognisable by its relatively large very loosely scattered almost pear-shaped spikelets and by being glabrous (except for the frequent presence of spreading hairs on the sheaths). Pearson and Gossweiler collected this and the preceding species apparently within a short radius, and Pearson's 2367 might be considered as intermediate and possibly a cross between the two. The other specimens are markedly different.

(Hochst.)

37. B. serrifolia, Stapf. Annual, up to over 3 ft. high. Culms single or scantily fascicled, suberect from a geniculate or prostrate and then rooting base, somewhat stout, 5-many-noded, branched from near the base or all along, with the branches suberect or obliquely spreading, glabrous, usually loosely hairy in the upper parts of the internodes. Leaf-sheaths rather thin or the upper subherbaceous, often slipping off the internodes and rolling round the adjoining branch, strongly striate, more or less hirsute with tubercle-based hairs; ligules a narrow ciliolate rim; blades lanceolate-linear from a rounded or cordate or obtusely auricled base, long-tapering to a slender point, 3-8 in. by 5-10 lin., flat, thin, but hardly flaccid,





another 2171 wey deferrent in bear -

green, quite glabrous, often rough on the nerves above, margins cartilaginous, densely spinulously serrulate, primary lateral nerves 3-6 on each side, obscure above, with numerous fine secondary ones between them, midrib slender. Panicle at length more or less exserted, rather secund, of 5-7 solitary subsrect or at length spreading slightly lax racemes; common axis slender, terete, angular and more or less channelled adaxillarily, scabrid. Racemes stout, subsessile or the lowest shortly peduncled (sometimes with the rudiments of arrested spikelets), 2-1 or the lower up to over 3 in. long, usually simple; rhachis very slightly flexuous, triquetrous, up to \(\frac{1}{4}\) lin. wide, scabrid along the angles, glabrous except on the pubescent basal pulvini; pedicels paired or upwards solitary, filiform, angular, scabrid, with or without some long very fine spreading hairs, the longer Spikelets or pairs of spikelets distant by 2-3 (rarely $1\frac{1}{2}$ - $2\frac{1}{2}$ lin. long. up to 5) lin., elliptic to obovoid-oblong in outline, subacute, more or less turgid, 2-2½ lin. long, greenish, quite glabrous. Glumes very unequal; the lower broad-ovate, subacute to almost obtuse, clasping at the base, over one-third the length of the spikelet, 5-nerved, sidenerves anastomosing; upper glume corresponding in shape and size to the spikelet, 7-nerved, thinly herbaceous-membranous. Lower floret neuter: valve very similar to the upper glume, but 5-nerved; valvule oblong, obtuse, about $1\frac{3}{4}$ lin. long, very thin, keels winged. Upper floret \(\xi \), elliptic-oblong, subacute, up to 2 lin. long, turning brown; valve and valvule coriaceous-crustaceous, somewhat coarsely transversely rugose, the latter with sharply projecting keels.— Panicum serræfolium, Hochst. in Flora, 1855, 196; Schweinf. Beitr. Fl. Aethiop. 301; Durand & Schinz, Consp. Fl. Afr. v. 765; Chiov. in Ann. Istit. Bot. Roma, viii. 302.

Nile Land. Eritrea: Dembelas; along the Makatar torrent, Pappi, 6046; along the Albo torrent, Pappi, 6089. Ocule Cusai; along the Tserena and Belesa torrents, 5250 ft., Pappi, 1810. Abyssinia: Jaja, 5000 ft., Schimper, 2171! Hamedo plain, 4700 ft., Schimper, 1082!

(Maz)

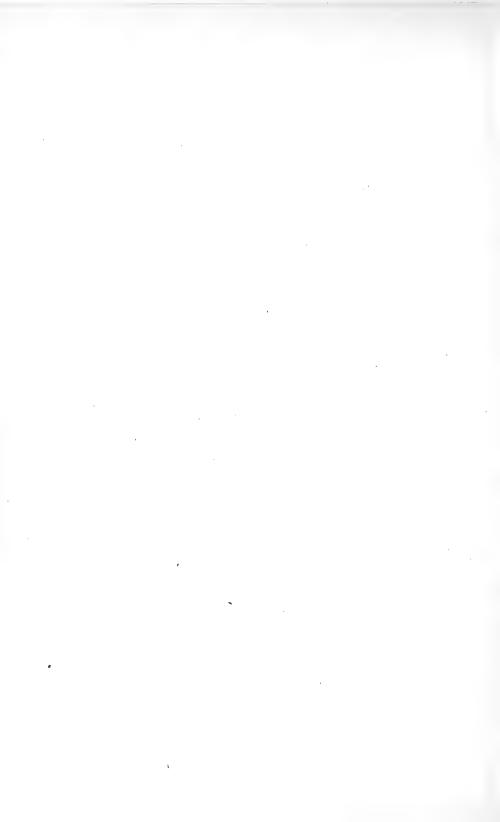
38. B. pubifolia, Stapf. Annual, not much over 1 ft. high. Culms very scantily fascicled, ascending from a shortly decumbent geniculate and rooting base, slender, terete, few-noded, the uppermost internode by far the longest, branched below, with all the branches at length flowering, pubescent. Leaf-sheaths thin, striate, at least the lower rather loose, pubescent; ligules a shortly ciliolate rim; blades narrowly linear from an equally wide base, tapering to an acute point, 2-4 in. by 2-3 lin., flat, flaccid, pale green, densely pubescent, margins scaberulous upwards only, primary lateral nerves 3-4 on each side, indistinct above, with numerous fine secondary ones between them, midrib very slender. Panicle long-exserted, secund, 2½-3 in. long, of 6-3 obliquely spreading solitary distant dense but slender spike-like racemes, all its axes densely pubescent; common axis slender, terete or adaxillarily flattened or (upwards) channelled,

terminating with a short barren point, overtopped by the uppermost raceme; racemes $1\frac{1}{4} - \frac{3}{4}$ in. long, rather stiff, sessile or subsessile, simple; rhachis almost straight, triquetrous, up to \frac{1}{4} lin. wide, scaberulous along the angles; pedicels mostly solitary or the lower paired, usually all (except the terminal) very short and relatively stout, so that the spikelets become subsessile, pubescent with some longer hairs near the tips. Spikelets strictly secund, more or less 1-seriate or 2-seriate at the base, very close and laterally contiguous or the uppermost more distant, obovate-oblong in outline, apiculate, slightly turgid, 1\frac{1}{4} to almost 1\frac{1}{2} lin. long, pale. Glumes very unequal; the lower broad-ovate, subacute, clasping at the base, about one-third the length of the spikelet, very thin, 5-7-nerved, the faint sidenerves more or less distinctly anastomosing; upper corresponding in shape and size to the spikelet, membranous, finely pubescent, 5-nerved, with few transverse veins below the tip. Lower floret neuter: valve very similar to the upper glume, if not less pubescent between the inner side-nerves; valvule delicate, oblong, \(\frac{3}{4} \) lin. long. Upper floret \(\times \), oblong to elliptic-oblong, subapiculate, \(1 \) lin. long, pale; valve and valvule thinly crustaceous, smooth or almost so. Anthers \frac{1}{2} lin. long.—Panicum pubifolium, Mez in Engl. Jahrb. xxxiv. 137; not of Nash.

Nile Land. British East Africa: Ukamba; Kitui, Hildebrandt, 2665!

39. B. glauca, Stapf. Perennial (always?), 1 to almost 2 ft. high, very glaucous in all its parts, densely tufted on a short rhizome, innovations intravaginal (always?), cataphylls thin, submembranous, whitish-pubescent. Culms slender, geniculately ascending, terete or the lower internodes compressed, particularly when they are elongated and arching, simple or sparingly branched, up to 7-noded, glabrous or more or less pubescent or the lowest internodes almost villous. Leaves delicately pubescent to almost villous or the uppermost sometimes glabrescent; sheaths thin, the lower loose and sometimes slipping off the culm, or like the upper rather tight; ligules a dense fringe of hairs, about \(\frac{1}{2} \) lin. long; blades linear from an equally wide or attenuated base, long-tapering to a fine somewhat callous point, 3-6 in. by 1½-3 lin., flat, flaceid, margins scaberulous, not or very finely cartilaginous, primary lateral nerves 3-4 on each side, slightly raised below, midrib slender, whitish, shallowly channelled above, somewhat raised below. Panicle at length exserted, 3-5 in. long, subsecund, of 3-9 mostly solitary (rarely the lowest 2-nate) distant oblique spike-like racemes; common axis very slender, angular, channelled adaxillarily, scabrid along the angles, more or less pubescent or glabrous. Racemes slender, the lower $1-1\frac{1}{2}$ in. long, the upper gradually shorter, straight or slightly flexuous, sessile or subsessile with a marked villosulous pulvinus at the base, or the lowest on a peduncle up to 4 lin, long, simple, rarely with 1 or 2 short 3-spiculate secondary racemes at the base, loose;





rhachis trigonous, very slightly wavy or straight, $\frac{1}{5}$ lin. wide, scabrid on the angles, otherwise glabrous or pubescent and with or without scattered fine long hairs, intermediate internodes 12-3 lin. long; pedicels solitary and short, less frequently 2-nate, very unequal, the longer 1, rarely up to 2 lin. long, scabrid with long fine hairs at the tips. Spikelets broad-oblong, obtuse or subobtuse, not apiculate, slightly turgid, quite glabrous, $1\frac{1}{4}$ - $1\frac{1}{2}$ lin. long. Glumes very unequal, the lower very broadly ovate, subacute, clasping, one-third the length of the spikelet, hyaline, 1-nerved, sometimes with several very short lateral nerves; upper glume corresponding in outline and size to the spikelet, membranous, 7- rarely 5-nerved, nerves fine, more marked and prominent upwards. Lower floret neuter: valve very similar to the upper glume, 5-nerved; valvule oblong, truncate, more or less reduced. Upper floret &, slightly shorter than the lower, oblong, subacute, pale; valve and valvule crustaceous, finely transversely rugose or almost smooth.—Panicum Hygrocharis, Schweinf, in Bull. Herb. Boiss, ii. App. ii. 23; not of Steud. P. nudiglume, var. major, Balf. f. Bot. Socotra, 311.

Nubia: O-Mareg, west of Sinkat, 3000 ft., Schweinfurth, 685 partly! Socotra, Balfour, 47!

Also in tropical Arabia (Hodjela, Schweinfurth, 950! and Aden, Birdwood!).

A very similar grass was collected by Stocks near Karachi, Scind, but the spikelets are somewhat larger ($1\frac{3}{4}$ lin. long), and the lower glume distinctly 5-nerved and very acute. Some of his specimens are, like those collected by Balfour in Socotra, distinctly perennial as described above.

(Hochet.)

40. B. leersioides, Stapf. Annual, 1-2 ft. high, the whole plant more or less glaucous. Culms in small fascicles, more or less geniculate, subcrect or ascending and then the lower internodes, which are generally somewhat compressed, often arching, about 4-noded, branched below, slender, grooved on the adaxillary side, glabrous, smooth, often with a fine waxy coating. Leaf-sheaths rather thin, the lower more or less compressed, loose and often slipping off the culm, longer than the internodes, the upper tighter and terete, all quite glabrous and smooth or the lower with spreading tuberclebased hairs; ligules thinly membranous, up to ½ lin. long, truncate, ciliate; blades linear from an equally wide or somewhat narrowed base, long-tapering to a slender point, 3 to over 6 in. by 2-4 lin., flat, thin, subflaccid, glabrous or with a few tubercle-based hairs downwards, slightly rough, nerves numerous and very close, about 3-4 primary laterals on each side, midrib very slender. Panicle at length usually long-exserted, ovate to oblong in outline, 3-6 (rarely up to 9) in. long, of 4-12 solitary distant quaquaversal horizontally spreading or somewhat deflexed slender spike-like racemes; common axis slender, grooved, straight or subflexuous; racemes up to $1\frac{1}{2}$ (rarely up to over 2) in. long, the uppermost often much shorter, shortly $(1-1\frac{1}{2} \text{ lin.})$ peduncled to subsessile, the longer often sub-

composite towards the base with short secondary racemes, moderately dense; rhachis frequently wavy, triquetrous, about \frac{1}{4} lin. wide, with scattered spreading tubercle-based hairs at least downwards, angles scabrid; pedicels very unequal, the longer 1 lin. long, rarely much longer, or the uppermost solitary, all somewhat stout and stiff, angular, scabrid, with or without a few tubercle-based hairs. Spikelets oblong, subacute, slightly convex on the back, $1\frac{1}{4}-1\frac{1}{2}$ lin. long, glaucous, glabrous. Glumes very unequal; lower ovate, acute or subacute, half as long (or nearly so) as the spikelet, membranous, whitish, finely 3-nerved; upper corresponding in size and outline to the spikelet, thinly papery, 5-7-nerved with very few cross-veins near the tip, nerves greenish. Lower floret of or neuter: valve very like the upper glume, 5-nerved; valvule almost as long as the valve, acute with smooth keels or more or less (sometimes very much) reduced, slightly papillose at the base; anthers $\frac{3}{10}$ $\frac{9}{10}$ lin. long. Upper floret $\noinde{\n$ straw-coloured; valve and valvule transversely wrinkled, subcrustaceous, the latter with the flaps widened and almost contiguous at a third or quarter from the base; anthers about $\frac{6}{10}$ lin. long. Grain elliptic in outline, flat on the face and the back with broad rounded sides, $\frac{7}{8}$ by $\frac{1}{2}$ lin., pale greenish.—Panicum leersioides, Hochst. in Flora, 1855, 196; Penzig in Atti Congr. Bot. Genoa, 1893, 366; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 21; Durand & Schinz, Consp. Fl. Afr. v. 752; K. Schum. in Engl. Pfl. Ost-Afr. C. 101; Chiov. in Ann. Istit. Bot. Roma, vi. 162, vii. 64, and viii. 33, 302; Stapf in Kew Bulletin, 1907, 213.

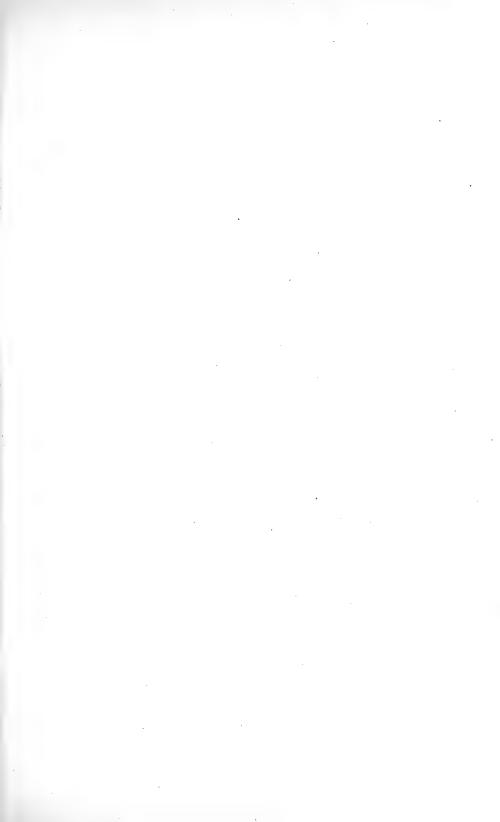
Nile Land. Nubia: O-Mareg (between Berber and Suakim), Schweinfurth, 685! Eritrea: Samhar; Lower Lava River, Schweinfurth, 1752. Island of Sheikh Said, Pappi, 6157. Assaorta; Arkiko, Schweinfurth, 48, 162, 281, 311. Amasen; Ghinda Valley, 3300 ft., Schweinfurth, 153; Pappi, 3425, 3745, 4027. Dongollo, Pappi, 1745! Upper Lava Valley; Maigarghebit, Penzig; Gheleb, Schweinfurth, 5000 ft., 1613, 1263. Bogos; Keren, Pappi, 2525; Tellini, 948, 1321. Dembelas; along the Mai Albo, Pappi, 6079. Abyssinia: Samen; Ussla Valley near Gurrsarfa, 4000–5000 ft., Schimper, 114! 2200! Harrar, Robecchi-Bricchetti; banks of the Ganam River, at Mele Merer, Riva, 403. Somaliland: Upper Sheikh, Appleton! British East Africa: Makindu, Linton, 173! Samburu, 900 ft., Kässner, 491! Witu, Gregory! Ngomeni, Scott Elliot, 6272! Rabai Hills, Taylor! Magarini; red sandhills, 300–500 ft., Taylor!

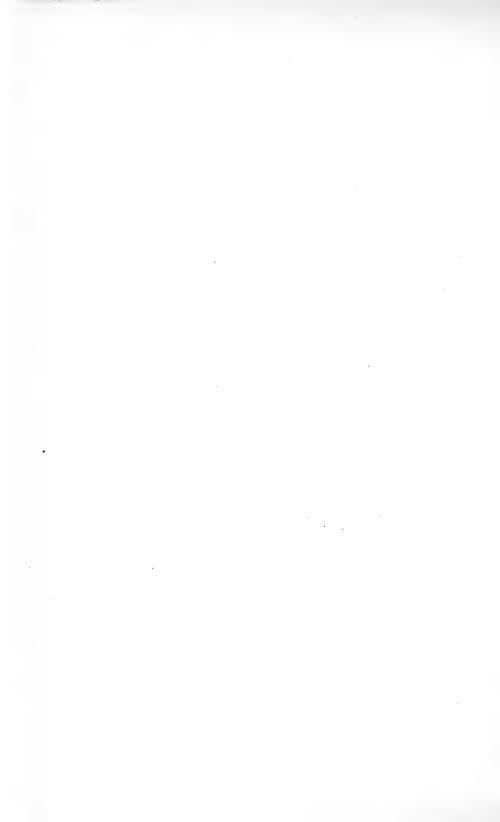
Mozambique Distr. German East Africa: Tanga, in cultivated ground, Schumann, 2031! Dar-es-Salam, Hildebrand, 1230! Portuguese East

Africa: Mozambique, in gardens, Scott!

Also in Tropical Arabia.
B. encacygranis (Atth) Greek

41. B. Isachne, Stapf. Annual, 1-2 ft. high, loosely tufted. Culms geniculately ascending from a sometimes decumbent and rooting base, very slender, terete or angular, glabrous, 3-many-noded, muchbranched below. Leaf-sheaths rather tight, terete or subterete, strongly striate, softly and loosely hairy or glabrous except at the minutely





villous nodes, the upper shorter than the internodes; ligules reduced to a dense fringe of short hairs; blades linear-lanceolate from a rounded base, acute, $1-2\frac{1}{2}$ in. by $1-2\frac{1}{2}$ lin., flat or involute, rather rigid, pale green, hairy or quite glabrous, margins very scabrid, nerves numerous, fine and close, midrib and primary laterals hardly differentiated. Inflorescence secund or subsecund, very narrow, 1-3 in. long, of 2-10 secund spike-like racemes, usually appressed to the filiform scabrid common axis, which is terete below and flattened upwards and scaberulous along the angles. Racemes simple, dense, $\frac{1}{2}$ -1 in. long; rhachis filiform, triquetrous, $\frac{1}{8}$ - $\frac{1}{7}$ lin. wide, straight or slightly wavy, scabrid or ciliate; pedicels solitary, very short, tightly appressed to the rhachis, relatively stout, scabrid or finely setulose, with thickened marginate tips. Spikelets 2seriate, distant \(\frac{1}{4}\) lin. or slightly more and therefore imbricate, oblong, subacute or obtuse, flat on the back, 1-11 lin. long, pallid with purplish tips, softly pubescent. Glumes very unequal, the lower usually reduced to a nerveless hyaline truncate scale, \frac{1}{6} lin. long, rarely ½ lin. long and 1-nerved; upper membranous, corresponding in outline and size to the spikelet, 5-nerved, minutely hairy. Lower floret neuter or more rarely 3: valve very similar to the upper glume, very faintly 5-nerved; valvule very obtuse, subequal to the valve in 3, shorter in neuter florets. Upper floret &, ellipticoblong, obtuse, $\frac{3}{4} - \frac{4}{5}$ lin. long: valve and valvule thinly crustaceous, shining, whitish or at length brownish, finely granulate. Anthers $\frac{1}{2}$ lin. long. Grain oblong-elliptic or obovate-oblong, $\frac{1}{2}$ lin. long, more or less flattened on both sides, but mainly on the back, olivegreen; scutellum more than half the length of the grain.—B. eruciformis, Gris. in Ledeb. Fl. Ross. iv. 469. Panicum Isachne, Roth ex Roem. & Schult. Syst. ii. 458; Roth, Nov. Pl. Sp. 54; Schult. Mant. ii. 252; Kunth, Enum. i. 97; Steud. Syn. Pl. Glum. i. 57; Hook. f. Fl. Brit. Ind. vii. 28; Stapf in Dyer, Fl. Cap. vii. 390; Burtt-Davy in Rep. S. Afr. Soc. Advanc. Sc. 1904, 269; Eyles in Trans. R. Soc. S. Afr. v. 300. P. eruciforme, Sibth. & Sm. Fl. Græca, i. t. 59, and Fl. Græc. Prodr. i. 40; Kunth, l.c. 78; Baker, Fl. Maurit. 434; Aschers. & Schweinf. Ill. Fl. Egypte, 159; Engl. Hochgebirgsfl. Trop. Afr. 120; Klatt in Jahrb. Hamb. Wiss. Anst. ix. 120; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 19; Durand & Schinz, Consp. Fl. Afr. v. 748; Chiov. in Ann. Istit. Bot. Roma, viii. 300. P. caucasicum, Trin. Sp. Gram. Ic. t. 262, Panic. Gen. 149, and in Mém. Acad. Pétersb. 6me sér. iii. 237. *P. Wightii*, Nees, Fl. Afr. Austr. 29; A. Rich. Tent. Fl. Abyss. ii. 364; Steud. l.c. 58; Durand & Schinz, l.c. 748. P. pubinode, Hochst. ex A. Rich. l.c. 363; Steud. l.c. 57; Durand & Schinz, l.c. 760. Echinochloa eruciformis, Koch in Linnæa, xxi. 437; Reichb. Ic. Fl. Germ. i. t. 29, fig. 1413.

Nile Land. Eritrea: Amasen; along the Mareb, *Pappi*, 352, 489, 2407; Sala Dharo, 7550 ft., *Pappi*, 2313; Asmara, *Tellini*, 357. Sarae; Adi Gana, 6200 ft., *Pappi*, 302; Adi Ugri, 7550 ft., *Pappi*, 93. Terammi, 7550 ft.,

Pappi, 597. Ocule Cusai; Deggaheu, 8530 ft., Pappi, 1355. Deca Mere, 6560 ft., Pappi, 2436. Abyssinia: Tigré; Addi Dschoa (? Additcha), Schimper, 1020! Hamedo plain, 4500 ft., Schimper, 1014! Debrasina, Quartin Dillon. Samen; region of the Tacazze River, Schimper, 1855! Jaja, 6000 ft., Schimper, 243! and without precise locality, Schimper, 1868!

Lower Guines South Angola: in onen Acadia forest between Quipita

Lower Guinea. South Angola: in open Acacia forest between Quibita

and Gambos, Pearson, 2228! Hereroland: Oyinka, Dinter!

Mozambique Distr. Zanzibar: in various localities, Stuhlmann.

Pearson's specimen has the inflorescence characteristic of B. Isachne, but its spikelets approach rather those of B. powoides (see below).

42. B. powoides, Stapf. Annual, up to 2 ft. high, loosely tufted. Culms geniculate-ascending, slender, much branched below, terete, glabrous or the lowest internodes hairy, about 4-noded, the uppermost internode far exceeding the others. Leaf-sheaths terete, the lower loose and slipping off the culm, the upper tight, striate, softly and loosely hairy, villosulous at the nodes; ligules reduced to a fringe of short hairs; blades linear from a shortly narrowed base, long-tapering to a slender point, 3-4 in. by 3-7 lin., flat, flaccid, pale green, finely and loosely pubescent, margins scaberulous, nerves numerous, close and very fine, midrib very slender, whitish. Panicle ovate in outline, sometimes subsecund (the upper part), 3-6 in. long, up to over 2 in. wide, loose; branches obliquely erect or spreading, finely filiform, often flexuous, scabrid and like the primary axis loosely and finely pubescent, the lower often 2-nate, up to over 3 in. long, bare for $\frac{1}{2}$ - $\frac{1}{2}$ in., then bearing up to 5 peduncled short racemes, or like the upper primary branches reduced to a single secund raceme. Racemes secund, simple, dense, up to over 4 lin. long or the lower compound and often interrupted at the base with short pauci-spiculate secondary racemes; rhachis finely filiform, 1/8 lin. wide, more or less straight, subtriquetrous below, more or less semiterete upwards, scaberulous and puberulous; pedicels solitary, very short, tightly appressed to the rhachis, of the same vestiture as the rhachis, with obscurely discoid tips. Spikelets of the longer racemes 2-seriate, distant by about ½ lin., imbricate or laterally contiguous, of the short racemes more or less clustered, all oblong, subacute to almost obtuse, flat on the back, 1½ lin. long, pale greyishgreen, often tinged with purple, softly pubescent. Glumes very unequal: the lower reduced to a minute hyaline nerveless broadovate scale, the upper corresponding in outline and size to the spikelet, thinly membranous, finely 5-nerved, tips very minutely denticulate. Lower floret neuter or of (?): valve similar to the upper glume, but less pubescent and much depressed between the inner side-nerves; valvule oblong, obtuse, somewhat shorter than the valve, obtuse; anthers rudimentary. Upper floret \(\noting\), oblong to elliptic-oblong, whitish or ultimately light brown, very glossy and smooth; valve and valvule thinly crustaceous. Anthers \frac{1}{2} \lin. \long.

Lower Guinea, Angola: Mossamedes; common among undergrowth in



4 St. C. C. C. Marie Marie Marie Marie

open forest near km. 108.5 of the Mossamedes railway, Pearson, 2849! among rocks in open forest between Gambos Fort and the Mission Station, Pearson, 2446! Monino, abundant in dry grassland, Newton, 7! Serra de Chella, Newton, 3! Damaraland, Een!

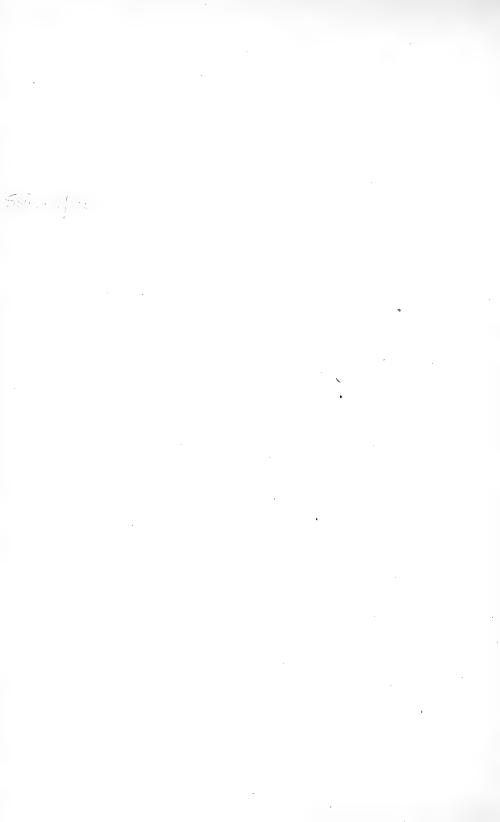
A fine grass, at the first glance very different from the *Brachiaria* type on account of the open more branched inflorescence; the ultimate racemes, however, particularly those towards the ends of the branches are very similar to those of *B. Isachne*, which they also approach very closely in the structure of their spikelets.

43. B. epaleata, Stapf. Annual, up to 12 ft. high. Culms slender, terete, subcrect or ascending from a short decumbent base, rooting from the lower nodes, sparingly branched below with the branches suberect and flowering, 5-6-noded, uppermost internode by far the longest, sparingly and minutely pubescent or slightly rough upwards. Leaf-sheaths subherbaceous, tight, striate, glabrous except on the sometimes pubescent or shortly ciliate outer margin; ligules a fringe of short stiff hairs; blades linear-lanceolate to sublinear from a shortly rounded, never clasping, base, tapering to an acute point, 2-4 in. by 2-5 lin., somewhat stiff, green, quite glabrous or with a few hairs at the base, margins cartilaginous, closely crisped, spinulously ciliolate, primary lateral nerves 3-5 on each side, fine, differentiated from the numerous and close secondary nerves only below, midrib very slender. Panicle long-exserted, asymmetrically obovate in outline or subsecund at least downwards, $2\frac{1}{2}$ -4 in. by 1-2 in., of 6-8 moderately distant solitary slender interrupted and compound or simple racemes; common axis slender, subterete and channelled at the base, then subtriquetrous, ciliate along the sharp angles, terminating with a spikelet. Racemes slightly flexuous or the shorter almost straight, the lowest 1½-3 in. long and obliquely erect, the upper much shorter and more spreading, all simple or the lower compound to beyond the middle with the secondary racemes loose and $\frac{3}{4} - \frac{1}{3}$ lin. long; rhachis very slender, triquetrous, up to $\frac{1}{5}$ lin. wide, ciliolate along the angles; pedicels solitary or geminate, filiform, angular, loosely pubescent, with some longer hairs at the tips, the longest up to $1\frac{1}{2}$ lin. long. Spikelets or pairs of spikelets or secondary racemes distant by 3½-2 lin., or the solitary spikelets of simple racemes and racemules often by slightly less than their own length, all the spikelets oblong, subacute or rather obtuse, slightly flattened on the back, 1½ lin. long, greenish, quite glabrous. Glumes very unequal, the lower broad-ovate, obtuse or subacute, clasping, over one-third the length of the spikelet, 3- or sub-5-nerved; the upper corresponding in shape and size to the spikelet, thinly membranous, 5-nerved. Lower floret neuter, reduced to the valve which resembles very much the upper glume but is slightly depressed on the back. Upper floret &, oblong, subacute, almost 1 lin. long, whitish; valve and valvule thinly crustaceous, delicately striate, rugulose, the transverse rugæ very short. Anthers ½ lin. long.—

Panicum nudiglume, A. Rich. Tent. Fl. Abyss. ii. 372 (partly); not of Hochst. ex Steud.

Nile Land. Abyssinia: Gallabat; Matamma, Schweinfurth, 1146! Samen; low places by the Tacazze River near Jelajeranne, Schimper, 1612!

Hoolast **44. B. semiundulata** Stapf. Annual, $\frac{1}{2}$ -1 ft. high, tufted. Culms slender, subcrect or ascending from a more or less prostrate base, geniculate and branched from the lower nodes, 3-6-noded, uppermost internode by far the longest, terete, glabrous, rarely pubescent, lower internodes sometimes compressed, often hairy below the nodes. Leaf-sheaths rather loose, the lower short and mostly hairy, the uppermost long, slightly tumid upwards, often glabrous except at the pubescent outer margin, all striate and pubescent or villous at the nodes; ligules a fringe of short hairs; blades lanceolate to (the lowest) subovate from a rounded base, acute or subacute, 1/2-2 in. by 2-4 lin., flat, somewhat thick, green, glabrous or more or less loosely hairy, margins markedly cartilaginous, scabrid or minutely spinulously ciliolate, the inner often crisped, primary lateral nerves 3-4 on each side, differentiated from the numerous very fine secondary ones only below, midrib very slender. Panicle long-exserted, more or less secund, of few to 8 obliquely erect or spreading spike-like solitary moderately distant mostly simple racemes; common axis slender, angular, pubescent or almost glabrous, scabrid or ciliolate along the angles, terminating with a spikelet. Racemes rather dense, rarely over ½ in. long, the uppermost shorter, all sessile or subsessile and simple or the lowermost sometimes with 1 or 2 very short secondary racemes at the base; rhachis very slender, wavy, about \frac{1}{7} lin. wide, more or less triquetrous, scabrid or ciliolate to ciliate along the angles, glabrous or pubescent on the faces; pedicels mostly solitary, very short with subdiscoid tips, or if paired the longer up to almost 1 lin. long, angular, scabrid, with few to many fine white hairs from the upper part. Spikelets mostly subsessile, about ½ lin. apart, 2-seriate and subcontiguous, subovoid, turgid, very convex on the back, 1 lin. long, subacute, green or faintly tinged with purple, glabrous or pubescent. Glumes very unequal; the lower broad-ovate, subacute to almost obtuse, about one-third the length of the spikelet, 1-3-nerved; upper corresponding in shape and size to the spikelet, thinly membranous, 5-nerved. Lower floret neuter: valve broad-elliptic, subacute, more or less flattened or slightly depressed and almost hyaline between the inner nerves, otherwise resembling the upper glume; valvule oblong, slightly shorter than Upper floret \(\preceq\), ovate to elliptic-oblong, shortly acute the valve. to subacute, almost 1 lin. long; valve and valvule crustaceous, straw-coloured, very finely pitted, without transverse wrinkles. Grain almost orbicular in outline, dorsally slightly compressed, $\frac{1}{2}$ - $\frac{2}{3}$ lin. long, dull pea-green; scutellum equalling three-quarters of the grain.—Panicum semiundulatum, Hochst, in Flora, 1841, i. Intell. Education 16/2 is type of Proceeding 2222 renderen May



Bl. 19 (name); A. Rich. Tent. Fl. Abyss. ii. 364; Steud. Syn. Pl. Glum. i. 63; Engl. Hochgebirgsfl. Trop. Afr. 120; Durand & Schinz, Consp. Fl. Afr. v. 765; K. Schum. in Engl. Pfl. Ost-Afr. C. 101; Chiov. in Ann. Istit. Bot. Roma, vii. 63. *P. nilagiricum*, Steud. l.c. 62. *P. villosum*, Hook. f. Fl. Brit. Ind. vii. 34, and in Trimen, Handb. Fl. Ceyl. v. 139 (partly); not of Lam. (?).

Nile Land. Abyssinia: Tigré; shady grassy places near Adoa, Schimper, 289! Shire plateau, Schimper, 1833! Metgalo, 6700 ft., Schimper, 1018! Lower Antitscho, 5500 ft., Schimper, 1022! Samen; Jaja, Schimper, 362! and without precise locality, Schimper, 177! 237! South Abyssinia; Djanbure (Djaribule?), among herbs, 11000 ft., Riva, 81. Uganda: Ruwenzori, Stuhlmann! British East Africa: near Nairobi, Miss Johnstone, 43!

Also in India (Western Ghauts) and Ceylon.

All the African specimens examined have glabrous spikelets, but those from India have them either glabrous or pubescent to a varying degree. In the Flora of British India, *l.c.*, Panicum semiundulatum is given as a synonym of *P. villosum*, but this also includes *P. coccospermum*, Steud. (*P. vestitum*, Nees ex Steud.), a species of Northern India where it ranges from the Chenab to Sikkim, the Khasia Hills and Upper Burma. Lamarck's description of *P. villosum* leaves it somewhat doubtful which of the two species was meant, though it points rather to *P. coccospermum*. On the other hand the source of the originals of *P. villosum*—namely, Sonnerat's collections—suggests *P. nilagiricum*. The question can only be decided by the examination of the type in the Lamarckian Herbarium. Chiovenda, in Ann. Istit, Bot. Roma, viii. 299, accepts Hooker's identification of *P. villosum*, Lam., with *P. nilagiricum*, Steud., and describes (p. 300) a var. *Erythræum*, which is said to be characterised by its smaller stature and smaller and glabrous spikelets. It is almost certainly the plant described here as *B. semiundulatu*. He quotes it from the following districts of Eritrea: Amasen, *Pappi*, 4780. Sarae, 6230 ft., *Pappi*, 22, 496. Ocule Cusai, *Pappi*, 1447, 2014, and Scimezana, Mount Matara, 9100 ft., *Pappi*, 928.

45. B. distichophylla, Stapf. Annual, \(\frac{1}{2}\)-1\(\frac{1}{2}\) ft. high. Culms very slender, terete, geniculate, usually ascending from a decumbent or prostrate and rooting base, often much branched below, the culms and branches gathered in more or less dense bunches, 5- to many-noded, the uppermost internode usually very long and like the preceding internodes (or at least their upper parts) pubescent, rarely glabrous. Leaf-sheaths more or less herbaceous, rather tight, those supporting a branch slipping off the internode and rolling round the branch, finely striate, more or less pubescent, sometimes densely so. or finely hirsute, rarely glabrous; ligules reduced to a narrow ciliolate rim; blades lanceolate or linear-lanceolate from a suddenly contracted rounded base, gradually tapering from very low down to an acute point, 1-2 in. by 2-3 lin., rarely longer, rather stiff and somewhat succulent, green, glabrous or more or less pubescent, margins markedly cartilaginous and usually crisped downwards, spinulously ciliolate to serrulate, primary lateral nerves 3-4 on each side, very fine and differentiated from the numerous and close secondary nerves only below, midrib very slender. Panicle at length long-exserted, secund, 1½-3 in. long, of 4-8 obliquely spreading or almost horizontal distant solitary slender spike-like mostly simple racemes; common axis very

slender, terete and adaxillarily channelled or more or less flattened upwards, terminating with a spikelet, scabrid along the angles, otherwise pubescent or glabrous. Racemes straight or slightly curved, the lowest \(\frac{1}{3}\) to over 1 in, long, gradually decreasing upwards. simple or very rarely slightly compound at the base with very short and scanty secondary racemes; rhachis more or less triquetrous, $\frac{1}{8}$ lin. wide, scabrid along the angles, pubescent or hirtellous, or glabrous; pedicels mostly solitary or the lower paired, all very short and relatively stout, so that the spikelets are subsessile, or the longer of the lowest pairs up to \frac{1}{2} lin. long, of the same vestiture as the rhachis, but usually with some longer stiff hairs. Spikelets secund, more or less 1-seriate or lower down irregularly 2-seriate, evenly distant by 1-1 lin. and then laterally contiguous, rarely much more remote and spreading, except towards the base where the raceme may become interrupted, oblong to obovate-oblong, acute or apiculate, slightly flattened on the back, 1-1½ lin. long, pale. Glumes very unequal; the lower ovate, subacute, sometimes mucronulate, clasping, very thin, slightly less than half the length of the spikelet, 3- to sub-5-nerved, the inner nerves anastomosing; upper glume corresponding in outline and size to the spikelet, membranous, somewhat prominently 5-nerved, usually pubescent, often with the hairs more numerous, longer and white below the tip so as to form a small tuft, or sometimes quite glabrous. Lower floret neuter: valve very like the upper glume, if not slightly longer, less hairy, more faintly nerved and slightly depressed between the inner nerves; valvule oblong, acute, delicate, more or less reduced or almost suppressed. Upper floret \(\beta \), slightly shorter than the lower, or equalling it and then their tips frequently exposed when quite mature, broad-oblong, subacute, pale; valve and valvule crustaceous. delicately granular. Anthers ½ lin. long.—Panicum distichophyllum. Trin. Diss. ii. De Gram. Pan. 147, and Sp. Gram. Ic. ii. t. 182; Kunth, Enum. i. 90; Benth. in Hook. Niger Fl. 560; Steud. Syn. Pl. Glum. i. 57; Durand & Schinz, Consp. Fl. Afr. v. 747, and Études Fl. Congo, 323; Durand & De Wild. Mat. Fl. Congo, 44; Rendle in Cat. Afr. Pl. Welw. ii. 170; Pobéguin, Ess. Hl. Guin. Franç. 214; Cheval. Sudania, 18; Th. & Hél. Durand, Syll. Fl. Congol. 632. P. cartilagineum, Nees, Agrost. Bras. 112. P. Despreauxii, Steud. l.c. 58; Durand & Schinz, Consp. Fl. Afr. v. 746. P. distichophylloides, Mez. in Eng. Bot. Jahrb. xxxiv. 137.

Upper Guinea. Senegambia: Cayor, Heudelot, 398! Sierra Leone: Mabum, Thomas, 1577! 1660! Binkolo, Thomas, 1785! Jigaya, Thomas, 2818! and without precise locality, Morson! French Guinea: Ségou, forming dense carpets, Lécard, 195! Kouroussa, common, Pobéguin, 476! 486! Timbo, in cultivated ground, Pobéguin, 1734! 1734*! French Sudan: Sindou, Chevalier, 875! Gold Coast: Christianborg, Johnson, 1041! Accra, Don: Brown, 328! Togo: Lome, Warnecke, 169! Southern Nigeria: Lagos, MacGregor, 38! Dalziel, 1135! Opobo, Jeffreys, 30! Igboho road, Dawodu, 7! Ebute Metta, Millem, 88! "in the interior," without precise locality, Rowland! Northern Nigeria: Stirling Hill, at the confluence of



1367 Beil in his tiglie of Pan. Lestich ophylloides Mg Link Men's specifica is not same as

173. El manager

46+B. scalaris (M2) Pèlq Parricum scalabre M23. fide Robyns the Niger and Benue, Vogel! Ansell! Lokoja, Richardson! Dalziel, 280! Nupe; about villages on cultivated ground, Barter, 719! Baikie! in shady ravines, Barter, 1367! Sokoto; common in fields, Dalziel, 475!

Lower Guinea. Belgian Congo: Cataracts District; Lukungu, in sand, 800-2000 ft., Hens, 215 A! Angola: Pungo Andongo; Pedras de Guinga,

Welwitsch, 2934!

Panicum Despreauxii, Steud., which is reduced here to a synonym of P. distichophyllum, was described from specimens which differ from typical examples of the latter only in that the longer white hairs of the spikelets are sometimes gathered into a well-defined transverse fringe below the apex which they overtop slightly. In other spikelets, however, of the same inflorescence, they are distributed more irregularly or are altogether very scarce, so that this peculiarity, which seems to have escaped the author, cannot be relied upon.

Panicum distichophylloides, Mez, has been referred here on account of Barter, 1367, the original of Mez's species; but the description, although tallying with B. distichophylla in most respects, differs in others, as the size of the blade $(\pm 70 \text{ mm. by } 4 \text{ mm.})$ and the spikelets $(\pm 4 \text{ mm.})$; also the presence of a large valvule in the lower floret. See also Barter 1367B under B. regularis (p. 545).

Excellent pasture grass, the ordinary fodder for the hippopotamus all the year through (Lécard).

46. B. kotschyana, Stapf. Annual, $\frac{1}{2}$ to over 2 ft. high. Culms slender or more often rather robust, terete, geniculate, usually ascending from a shortly decumbent or prostrate and then rooting base, rarely almost erect, more or less branched, with the branches suberect, few- to many-noded, the uppermost internode often very long, at length always more or less exserted and like the preceding internodes (or at least their upper parts) more or less pubescent or more rarely glabrous and smooth. Leaf-sheaths subherbaceous, rather firm and tight, those supporting a branch slipping off the culm and often rolled round the branch, striate, pubescent to softly and shortly hirsute; ligules reduced to a narrow ciliolate rim; blades lanceolate to linear-lanceolate from a shortly rounded but not clasping base, tapering to an acute point from low down, 1-3 in. by 2-5 lin., stiff and somewhat succulent, green, of the same vestiture as the sheath, rarely glabrescent with age, margins cartilaginous, minutely spinulously ciliolate and frequently closely crisped (at least one of them), primary lateral nerves 3-4 on each side, very fine, differentiated from the very numerous and close secondary nerves below only, midrib very slender. Panicle more or less exserted. secund or subsecund, 3 (rarely 2) to over 6 in. long, of 6 to very many oblique rarely subhorizontal moderately distant solitary slender more or less interrupted mostly compound racemes; common axis very slender, terete, adaxillarily channelled, or more or less flattened upwards, terminating with a spikelet. Racemes straight or flexuous and sometimes nodding, the lowest and intermediate $\frac{1}{2}$ to over 3 in. long, the following gradually shorter, compound up to or sometimes far beyond the middle, secondary racemes very short except the lowest which may be up to \frac{1}{2} (very rarely 1) in. long; rhachis very slender, subtriquetrous or semiterete and channelled in the lower

part, $\frac{1}{6} - \frac{1}{5}$ lin. wide, scabrid along the angles, otherwise pubescent or hirtellous and with some scattered long fine hairs, or more rarely glabrous; pedicels short to very short, the longer of a pair rarely over ½ lin. long, finely filiform, angular, scabrid, otherwise of the same vestiture as the rhachis, but usually with some fine stiff white hairs, often almost as long as the spikelet. Spikelets mostly in secund short racemules or clusters of 6-2, these distant by more than their own length, except near the base where the secondary racemes are sometimes elongated; spikelets oblong, subacute, slightly turgid and much gaping during flowering and frequently more or less so afterwards, 1 lin. long, pale or tinged with purple. Glumes very unequal, the lower ovate, acute or acutely acuminate, one-third to one-half the length of the spikelet, 2-5-nerved, very thin, often purple; upper oblong, usually slightly shorter than the spikelet, membranous, more or less loosely pubescent, 5-nerved. Lower floret 3; valve very similar to the upper glume but as long as the spikelet, with the inner side-nerves more apart and the space between them flat and glabrous or nearly so; valvule oblong, truncate or subacute, slightly shorter than the valve or more or less reduced; anthers if present $\frac{1}{2}$ lin. long. Upper floret \heartsuit , as long as the spikelets, the tip and the sides frequently uncovered owing to the gaping of the spikelet and the shortness of the upper glume, elliptic, subacute, whitish; valve and valvule thinly crustaceous, very finely granular. Anthers $\frac{3}{4}$ lin. long. Grain broad-elliptic, $\frac{3}{5}$ lin. by $\frac{2}{5}$ lin., flattened on both sides, pea-green; scutellum equalling three-quarters of the length of the grain.—Panicum kotschyanum, Hochst. ex Steud. Syn. Pl. Glum, i. 68; Fig. & De Not. in Mem. Acc. Torin, ser. ii. xiv. (1854) 348, t. xviii. figs. 1-15; Durand & Schinz, Consp. Fl. Afr. v. 752; Cheval. Sudania, 64, 79, 169. P. coccospermum, Franch. Fl. Congo Franc. 37; not of Steud.

Upper Guinea. Southern Nigeria: Aguku District, Thomas, 1079! 1390!

Northern Nigeria: Yola, common on rocky hills, Dalziel, 275!
North Central. Bagirmi; Lake Fettri (a very meagre state), Chevalier,

North Gentral. Bagirmi; Lake Fettri (a very meagre state), Chevalier, 9942! Shari Territory; Krebedje, Chevalier, 5450!
Nile Land. Jur: Ghattas' Great Seriba, Schweinfurth, 2312! Sudan: Cordofan; Mount Kohn, in fields, Kotschy, 254! Abyssinia: without precise locality, Quartin-Dillon, 196! Uganda: Entebbe, Fyffe, 2! 10! 44!
Lower Guinea. Portuguese Congo: Cabinda, Gossweiter, 6433! French Congo: Upper Oubangui; between Mandjafa and Bousso, Chevalier! Brazzaville, Thollon, 383! Chevalier, 4254! Belgian Congo: Stanley Pool District; Bokala, Vanderyst, 3651! District of Cataracts; Thysville, Vanderyst, 4354! 4375! Bangala District; Lisha, Hens, 332 C!
Mozambique Distr. German East Africa: Kilimaniaro: Marangu, 4900

Mozambique Distr. German East Africa: Kilimanjaro; Marangu, 4900 ft., Volkens, 657! and without precise locality, Stuhlmann!

Vanderyst's specimens are partly deformed (phyllody, nos. 3651 and 4375; Ustilago heterospora, no. 4354). A viviparous specimen collected by Maitland (no. 111) in Uganda is evidently also this species.

47. B. andongensis, Stapf. Perennial, about 2½ ft. high, tufted from a short hard rhizome; innovations extravaginal, sometimes

growing out into short stolons, covered with softly hairy rather

Volkens 657 is type of Parison realare Mg



thin cataphylls. Culms erect or geniculately ascending, slender, terete, many-noded, more or less branched below, with the branches erect. Leaf-sheaths rather tight, firm, shorter than the internodes except in the lower parts, striate, with hairy margins and mouth; ligules a ciliate narrow rim; blades linear-lanceolate from an equally wide base, tapering to a fine acute point, $1\frac{1}{2}-3\frac{1}{2}$ in. by 2-4 lin., rigid, spreading, glabrous or the lowest loosely hairy, margins cartilaginous, crisped here and there, minutely spinulose, nerves fine, numerous but obscure, the uppermost blade very short. Inflorescence erect, secund, up to $2\frac{1}{2}$ in. long, of up to 8 short oblique dense subsessile spiciform racemes; common axis slender. Racemes simple, secund, 2-seriate, the lowest about \frac{1}{3} in. long and up to 8-spiculate, the following gradually shorter with fewer (to 2 or even 1) spikelets; rhachis very slender, wavy, subtriquetrous, up to $\frac{1}{5}$ lin. wide, pubescent at the bare base, otherwise very minutely puberulous on the back, with or without some longer hairs from the angles; internodes ½ lin. long; pedicels very short, sparingly setulose, tips subdiscoid. Spikelets contiguous, broadly elliptic-oblong or elliptic in outline, subobtuse, turgid, $1\frac{1}{2}$ - $1\frac{1}{3}$ lin. long, pale greenish. Glumes very dissimilar, membranous, minutely hairy; lower broad-ovate, subobtuse, 3nerved, between a third and half of the length of the spikelet; upper broad-elliptic, obtuse, very convex on the back, almost semi-elliptic in profile, distinctly shorter than the spikelet, sometimes equalling only three-fourths of the fertile floret, faintly 5-nerved. Lower floret of: valve corresponding in outline and size to the spikelet (in front view), depressed on the back, very narrow in profile, faintly 5-nerved, minutely hairy on the sides; valvule elliptic, obtuse, almost as long as the valve, keels slender, flaps narrow; anthers Upper floret \u2200e4, elliptic-oblong, subacute, almost as long as the lower, the upper part more or less exposed, whitish: valve and valvules crustaceous, smooth or nearly so.—Panicum andongense, Rendle in Cat. Afr. Pl. Welw. ii. 167.

Lower Guinea. Angola: Pungo Andongo; in wet places, Welwitsch, 2793!

48. B. comata, Stapf. Annual, up to over 1 ft. high, loosely tufted. Culms suberect or geniculately ascending from a decumbent base, usually very slender, terete, more or less pubescent to almost glabrous, 4-many-noded, branched below or almost all along. Leafsheaths rather tight, the lowest often slipping off the culm, terete, strongly striate, softly hairy to subhirsute or glabrous with the exception of the pubescent outer margin and the villosulous nodes; ligules reduced to a dense fringe of short hairs; blades lanceolate to linear-lanceolate from a rounded base, tapering to a very acute point, $1\frac{1}{2}$ -3 in. by $2\frac{1}{2}$ -6 lin., flat, rather firm and somewhat succulent, pale or yellowish-green, loosely and softly hairy to almost glabrous, or subhirsute with minutely tubercle-based hairs, margins markedly cartilaginous and closely crisped, spinulously ciliolate, nerves very

fine and close, the primary lateral (3-4) differentiated and prominent below only, midrib very slender. Panicle secund or subsecund, narrow or semi-ovate in outline, $2\frac{1}{2}-3\frac{1}{2}$ in. long, of 7-10 secund oblique and often arching somewhat loose racemes; common axis very slender, terete and adaxillarily channelled or upwards slightly flattened, pubescent. Racemes sessile or subsessile, mostly compound downwards with short 4-2-spiculate secund secondary racemes, the lowest $1-2\frac{1}{2}$ or 3 in. long, the following gradually shorter; rhachis finely filiform, \frac{1}{8} lin. wide, subtriquetrous, scabrid and more or less ciliate or pubescent with short white hairs, hardly wavy at all; pedicels paired or solitary upwards, the paired unequal, the longer up to over 1 lin. long, filiform, with a small beard of white hairs near the Spikelets or pairs or clusters of spikelets about 1 lin. apart, those of a pair or cluster imbricate, otherwise hardly contiguous, slightly nodding, obovoid, rather convex on the back, $\frac{3}{4} - \frac{4}{5}$ lin. long, the obtuse or subacute apex concealed in a white coma. very unequal; the lower ovate, subacute or acute, thinly membranous, 3-nerved, finely pubescent; upper broad elliptic-oblong, shortly acute, equalling the spikelet, membranous, finely 5-nerved, pubescent with a transverse fringe of white hairs below the apex, the hairs up to over $\frac{1}{2}$ lin. long, forming a coma. Lower floret neuter: valve similar to the upper glume and of equal length, but concave on the back along the middle with the apex often slightly incurved; valvule narrowly oblong, delicate, the narrow keels giving out upwards. Upper floret \(\), elliptic-oblong, subacute, almost as long as the lower; valve and valvule thinly crustaceous, very finely granular. Anthers lin. long.—Panicum comatum, Hochst. ex A. Rich, Tent. Fl. Abyss. ii. 376; Steud. Syn. Pl. Glum. i. 57; Durand & Schinz, Consp. Fl. Afr. v. 743; Chiov. in Ann. Istit. Bot. Roma, viii. 30, 300.

Nile Land. Eritrea: Assaorta; Mount Dyot, 3900-5000 ft., Pappi, 5758. Amasen; Ghinda and neighbourhood, Terracciano & Pappi, 108; Pappi, 4066, 4217, 4801; Tellini, 1687. Scimezana; Mount Matara, 8000 ft., Pappi, 934. Abyssinia: Tigré; on rocks near Gafta, Schimper, 1196! and without precise locality, Schimper, 1017! 1076!

Imperfectly known species.

- 49. Panicum (Brachiaria) chætorrhachis, Hack. ex Heering in Arbeit. Deutsch. Landwirtsch.-Gesellsch. Heft 197, 15 (name only). Lower Guinea. Amboland: Otawifontein, according to Heering.
- 50. Panicum (Brachiaria) Emini, Mez in Engl. Jahrb. xxxiv. 135. Perennial (?). Culms slender to very slender, 1 ft. high. Leaf-sheaths keeled upwards, with usually scanty long hairs on the back and at the nodes; ligules very short, with long dense white hairs; blades suberect, lanceolate or narrowly lanceolate from a roundish base, gradually tapering to an acute point, about 2-2½ in. by 3 lin., flat, membranous, loosely long-hairy on both sides, margins cartilaginous crisped, ciliolate, midrib slender. Inflorsecence erect, secund,

& Claripilae Robers
B. Claripila (Chiar) Robers
Paniem Claripilum Chiar.
Aphlts with danjam hairs.

50 see p. 528



of about 3 erect arching spike-like racemes; common axis somewhat stout, densely and roughly ciliolate at the angles. Racemes secund, 1-seriate, not quite 1 in. long; rhachis flat, densely setulose-ciliate. Spikelets subsessile, solitary, contiguous, elliptic, acute or acuminate, 2 lin. by $\frac{9}{10}$ lin., greenish hairy. Lower glume broadly ovate, with rounded and more or less asymmetric tips, one-third to almost half the length of the spikelet, glabrous, 9-nerved; upper glume broadelliptic, acute or broadly acuminate, 5-nerved. Lower floret 3: valve like the upper glume if not broader; valvule as long as the valve or almost so, shortly acute. Upper floret elliptic, subacuminate; valve and valvule crustaceous, rugulose, yellowish-shining.

German East Africa: Lake region; Muansa Kafuro, Mozambique Distr.

Stuhlmann, 1915, 4663.

Evidently allied to B. falcifera.

(F. g. & D. not.)
51. B. jubata, Stapf. Perennial, up to 3 ft. high. Culms erect, simple, the exposed parts hirsute with yellowish hairs. Leafsheaths striate; ligules a densely ciliolate rim; blades linear, tapering gradually, very acute, up to 5 lin. wide, flat, spreadingly ciliate. Inflorescence long-exserted, about 4 in. long, secund, of erect or falcate distant secund spiciform racemes; common axis semiterete, slightly channelled on the face. Racemes dense, 2-seriate, lower not quite an inch long, the following gradually shorter; rhachis slightly flexuous, somewhat flattened with a prominent midrib on the finely pubescent face, margins densely ciliate with yellowish hairs almost as long as the spikelet; pedicels very short, setulose with subdiscoid tips. Spikelets contiguous, oblong, obtuse, about 2 lin. long, hairy. Glumes subequal, membranous; lower almost as long as the spikelet, broadly elliptic-oblong, very obtuse or submarginate, clasping below, glabrous, 11-12-nerved, nerves ending free, upper ovate-oblong, obtuse, as long as the spikelet, much narrower than the lower glume, appressedly hairy, 7-nerved with cross-veins. Lower floret as long as the spikelet, of: valve 5-nerved, upwards with cross-veins, hirsute along the sides and upwards; valvule elliptic-oblong, keels marginate. Upper floret \(\noting\), subelliptic in outline, apiculate; valve and valvule crustaceous, very delicately rugulose, the former with some cross-nerves near the apex. Stigmas large, purple.—Panicum jubatum, Fig. & De Not. in Mem. Acc. Torin. ser. ii. xiv. (1854) 331, t. 9, figs. 1-15; Durand & Schinz. Consp. Fl. Afr. v. 752.

Nile Land. Sudan: Cordofan, Figari.

According to Figari's fig. 1, which is stated to be to the scale of \times 3 natural size, the spikelets would be 2 lin. long, but according to figs. 2 and 3 (magnification 5) their length appears to be 3 lin. Evidently allied to B. fulva, but apparently differing in the larger size of the spikelets and the broader and more numerously nerved lower glume.

52. Panicum (Brachiaria) oligobrachiatum, Pilger in Engl. Jahrb. xxxiii. 50. Base not known. Culms stout (up to 3 lin, in diam.), tall, upwards with numerous flowering branches up to over 1 ft. Leaf-sheaths strongly striate, glabrous, smooth; ligules formed of setiform rigid hairs; blades linear-lanceolate from a shortly rounded base, long-tapering upwards, rigid, sparsely setulose on both sides, margins scabro-ciliate upwards, midrib stout towards the base, primary lateral nerves 6-7 on each side. Inflorescence of 3-4 distant dense spiciform racemes; common axis straight, channelled, glabrous, its internodes $1\frac{1}{3}-1\frac{2}{3}$ in. long. Racemes 2seriate, $1\frac{2}{3}$ - $2\frac{2}{3}$ in. long, simple or compound with short secondary racemes; rhachis with a slender puberulous pulvinus at the base, flat, herbaceous, 1 lin. wide, glabrous on the back, puberulous on the face, margins rough; pedicels solitary, very short, or 2-nate and then the primary slightly longer. Spikelets narrowly ovoid, acute, 2 lin. long, hairy. Glumes somewhat distant, the lower acute, less than half the length of the spikelet, broadly clasping at the base, with 11-13 parallel anastomosing nerves; upper ovate, acute, as long as the spikelet, 7-nerved, with some rather long white stiff hairs on the back. Lower floret δ ; valve very similar to the upper glume, 5-nerved; valvule as long as the valve. Upper floret ξ , as long as the lower; valvule chartaceous, shortly mucronate-apiculate, faintly 5-nerved; stigmas dark-violet, short.—P. brizanthum (?), Schlechter, West-Afr. Kautsch.-Exped. 268.

Lower Guinea. French Congo: in scrub near Bonga at the mouth of the Sanga River, Schlechter, 12663.

Evidently closely allied to *B. interstipitata*, but apparently differing from it in the setulose leaf-blades, the numerous flowering branches, each of which bears only 3-4 racemes, and the long stiff white hairs of the spikelets.

53. Panicum ozogonum, Steud. Syn. Pl. Glum. i. 68. Culms geniculate, proliferously branched from the nodes, over 1 ft. high. Leaf-sheaths with tubercle-based hairs; blades lanceolate from a clasping cordate base, acute, 1–2 in. by $2\frac{1}{2}$ –3 lin., very finely pubescent. Panicle $1\frac{1}{2}$ –3 in. long, of erect solitary subsessile compound (?) racemes. Spikelets solitary "alternately pedicelled and sessile" or 2-nate, ovate, pubescent. Lower glume ovate, obtuse, sometimes very shortly mucronulate; upper equalling the lower floret, 3–5-nerved. Upper floret \u2203, transversely rugose.—Durand & Schinz, Consp. Fl. Afr. v. 758.

Upper Guinea. Senegambia, Leprieur.

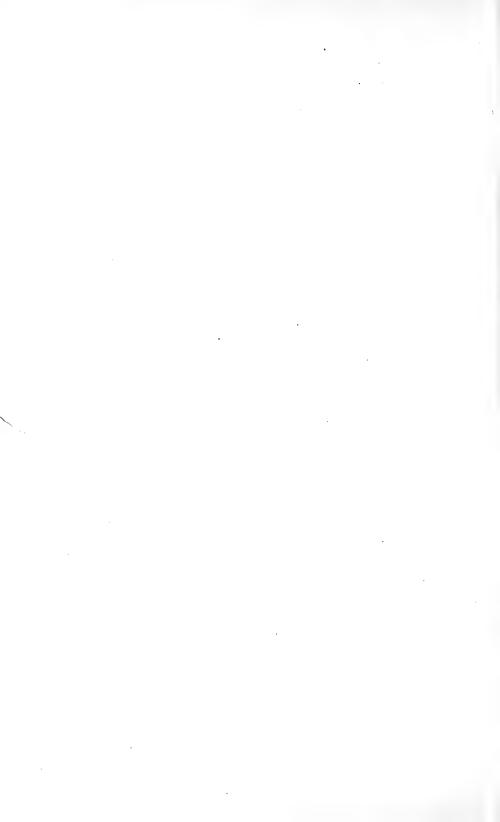
I have not found this species in Steudel's Herbarium in Paris. It is probably $Brachiaria\ ramosa.$

54. Panicum schimperianum, Chiov. in Ann. Istit. Bot. Roma, viii. 303.

Nile Land. Eritrea: Assaorta; along the Haddas torrent, Pappi, 2645.

Chiovenda quotes A. Richard (Tent. Fl. Abyss. ii. 371) and Steudel (Syn. Pl. Glum. i. 68) as authorities for P. schimperianum. A. Richard based this





species on a plant distributed by Schimper under no. 1853 (sect. III). The specimens of this number, as far as I have seen them, belong to Panicum meyerianum, Nees, and A. Richard's description supports that identification. Steudel had evidently the same plant under Schimper's number 1853. According to Chiovenda the plant from Assaorta has rigid, hard culms, very obtuse, whitish glossy and quite glabrous spikelets, with the tips of the upper glume and lower valve subcartilaginous, and the nerves slightly or not at all raised. The duration of the plant is given as biennial or possibly perennial. The description of the spikelets suggests B. ovalis. On the other hand Chiovenda compares the grass with Panicum velutinosum (= P. molle), P. distichophyllum and P. kotschyanum, and adds that A. Richard's description of P. schimperianum points to a species different from the Amasen plant, whilst Steudel's treatment of it suggests an affinity with P. maximum. In view of these conflicting statements and in the absence of specimens I am unable to verify Chiovenda's determination.

55. Panicum subquadriparum, Trin. ex Hack. in Bolet. Soc. Brot. vi. (1888) 141.

Mozambique Distr. Portuguese East Africa: banks of the Zambesi, Carvalho.

P. subquadriparum, Trin., described from specimens collected by Escholz and Chamisso in the Marianne Islands, is identical with P. distachyum, Linn. (Brachiaria distachya, Stapf), a species not recorded so far from continental Africa. Durand & Schinz in their Conspectus Floræ Africæ, vol. v. (1895) 747, quote it for Mauritius, citing P. subquadriparum as synonym on Hackel's authority, but do not refer to Carvalho's plant and its determination by Hackel. Can the latter be P. arrectum, Hackel in Durand & Schinz, l.c. 741, under which P. subquadriparum, Nees (non Trin.), is given as a synonym? I know this, however, only from extratropical South Africa.

56. Panicum velutinosum, Nees in Chiov. in Ann. Istit. Bot. Roma, viii. 303.

Nile Land. Eritrea: Amasen; Mai Atal, Pappi, 3203. Ocule Cusai; Loggo Sarda, Deggahea, 8500 ft., Pappi, 1385. Maragus; Cohait, 5570 ft., Pappi, 1019.

 $P.\ velutinosum$, Nees, which is identical with $P.\ molle$, Swartz (see Hitchcock in $Contrib.\ U.S.\ Nat.\ Herb.\ xii.\ 137$), is a species of tropical America, and not a Brachiaria, as this genus is understood here. From Chiovenda's remarks (l.c. 304) it appears that the Amasen specimens have smaller spikelets $(1-\frac{1}{2}$ lin. long) with a scantier indumentum and less rugose fertile floret, and resemble as to size and disposition those of $P.\ kotschyanum$, which has, however, a more mucronate upper glume and lower valve. The other examples have longer and turgid spikelets $(1\frac{1}{2}-1\frac{3}{4}$ lin.) which are, moreover, densely hairy, with the hairs increasing in length upwards. They approach "Panicum helopus" as to the shape of the spikelets, but lack the characteristic mucro of the latter. In the absence of specimens I am unable to refer Chiovenda's $P.\ velutinosum$ to any of the species of Brachiaria described here.

63. AXONOPUS, P. Beauv. Agrost. 12.

Spikelets elliptic-oblong to oblong or lanceolate, depressedly biconvex, falling entire from the rudimentary pedicels, solitary, secund and adaxial on the triquetrous or more or less flattened rhachis of very slender spikes or spike-like racemes; lower floret barren, reduced to the valve; upper floret \(\). Glumes: the lower suppressed, the upper equal to the spikelet, membranous, very finely or faintly 5-4-nerved. Lower floret: valve very similar to the upper glume, with the nerves still finer and the middle-nerve often Upper floret: valve chartaceous to crustaceous, with firm margins, obtuse, emucronate, faintly 4-nerved; valvule equal or subequal to the valve and similar in substance, tightly embraced by the narrowly involute margins of the valve. Lodicules 2, minute, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted near the tip of the floret. Grain tightly enclosed by the slightly hardened valve and valvule, elliptic, dorsally much compressed, flat on both sides; hilum subbasal, punctiform; embryo less than half the length of the grain.—Stoloniferous or cæspitose perennials; blades more or less linear, flat or folded or involute; ligules very narrow, membranous; spikes 2 or more, often very many, digitate or subdigitate, if many then usually crowded on a short common axis, sessile, simple; spikelets usually small to very small, and closely appressed to the rhachis which is sometimes chambered by the rudimentary pedicels and their widened insertions forming crossbars running from the facial angle to the margin.

Species about 35, mostly in tropical America, one also in Africa and introduced in other parts of the tropics.

As to the application of Beauvois' name Axonopus to this group, see Chase in $Proc.\ Biol.\ Soc.\ Washington, xxiv.\ 129-131.$

1. A. compressus, P. Beauv. Agrost. 154. Perennial, \(\frac{1}{2}\)-2 ft. high, in small tufts and solitary culms from a very slender rhizome densely covered with the scars of decayed cataphylls and from long slender creeping and rooting runners. Culms erect or geniculately ascending, 1-3-noded, slender, more or less compressed or angular below, glabrous, smooth. Leaf-sheaths compressed, the basal very much so, crowded and flabellate, somewhat thin and pale, all quite glabrous, rarely sparingly hairy, striate and smooth; ligules a narrow membranous rim, minutely ciliolate; blades lanceolate-linear to linear from a frequently more or less rounded base, obtuse or subobtuse, more rarely shortly acute, 2-5 in. by 2-6 lin., folded or flat, bright green, quite glabrous or rigidly ciliate, rarely loosely hairy all over, midrib and primary lateral nerves (up to 5 on each side) very slender, but quite distinct below. Inflorescence of 2-3 or sometimes up to 5 subdigitate sessile erect or spreading spikes; common axis very slender, angular, glabrous, if 3 or more spikes the lowest internode often over 1 in. long. Spikes very slender, 2-4 in. by $\frac{1}{4}$ to over $\frac{1}{2}$ lin., straight or (if long) flexuous, green, glabrous; rhachis triquetrous, mostly less than ½ lin. wide, green with narrow herbaceous margins or wings, angles scaberulous or almost smooth, internodes $\frac{3}{4} - \frac{1}{2}$ lin. long; pedicels solitary, alternately to the right and the left of the





frontal angle, reduced to smooth elliptic subsessile discs. Spikelets oblong to lanceolate-oblong, subacute to acute, not rarely acuminate, $1-1\frac{3}{4}$ rarely 2 lin. long, green. Glume corresponding to the size and shape of the spikelet, with very narrowly incurved margins, membranous on the back, more or less papery on the sides, typically 5-nerved, sometimes 4-nerved owing to the obliteration of the middlenerve, side-nerves approximate towards the margins, 4 lines of very fine appressed hairs (one on each side between the side-nerves and another inside the inner side-nerve), or sometimes the hairs more loose and scanty, or the inner lines of hairs absent. Lower floret reduced to a valve very similar to the glume but usually without a middle-nerve. Upper floret &, much shorter than the spikelet, rarely exceeding 1 lin., elliptic-oblong, obtuse, white: valve and valvule thinly crustaceous, the former very faintly 4-nerved, finely and shortly hairy at the tip. Anthers $\frac{1}{4}$ lin. long. Grain elliptic in outline, obtuse, white, about $\frac{6}{10}$ lin. by $\frac{3}{10}$ lin.; scutellum rotundate-elliptic, not reaching to the middle of the grain.—Chase in Proc. Biol. Soc. Wash. xxiv. 132; Hitch. & Chase in Contr. U.S. Nat. Herb. xviii. 300. Milium compressum, Sw. Prodr. 24. Paspalum tristachyum, Lam. Ill. i. 176. P. platycaulon, Poir. Encycl. Suppl. v. 34; Fluegge, Monogr. Pasp. 116 (Paspalus platycaulis); Trin. Gram. Panic. 95, and Sp. Gram. Ic. t. 118; Kunth, Enum. i. 48; Steud. Syn. Pl. Glum. i. 22 (platycaule); Baker, Fl. Maurit. 431; Doell in Mart. Fl. Bras. ii. ii. 101; Durand & Schinz, Consp. Fl. Afr. v. 738; Ridley in Agric. Bull. Straits & Fed. Malay St. ii. 275; Backer in Teysmannia, xxiv. 371 t. 8. P. compressum, Rasp. in Ann. Sci. Nat. 1re sér. v. 301; Nees, Agrost. Bras. 23; Schlechtend. in Bot. Zeit. 1850, 682; Lamson-Scribn. in U.S. Dep. Agric. Div. Agrost. Bull. vii. 42, fig. 24; Ball in U.S. Dep. Agric. Div. Agrost. Circ. no. 28, 6. P. laticulmum, Spreng. Syst. i. 245. P. platyculmum, Pet. Thouars ex Nees, Agrost. Bras. 24; Kunth, l.c., 49; Steud. l.c., 30; Durand & Schinz, l.c. P. complanatum, Steud. I.c., 22. Anastrophus compressus, Schlechtend. ex Nash in North Amer. Fl. xvii. 162. A. platycaulis, Nash in Small, Fl. S.-E. U.S. 79. Panicum sanguinale, Klatt in Durand & De Wild, Mat. Fl. Congo, i. 91 (accord. to the specimen quoted); not of Linn.

Upper Guinea. Sierra Leone: Mabum, 370 ft., Thomas, 1599! French Guinea: Timbo, Pobéguin, 1703! Ivory Coast: Cavally basin, Chevalier, 19762! Southern Nigeria: banks of the Brass River, Barter, 1842! Opobo, Jeffreys, 4! 29. Lagos; Ikoyi Plains, Dalziel, 1313!

Lower Guinea. Belgian Congo: Kwango District; sandbanks of islands of

Kwilu River, Vanderyst, 2617 partly! Stanley Pool District; Kutu, Vanderyst,

3538! M'Sonata, Hens, C 162!

Common throughout continental tropical America, in the West Indies and southern and south-eastern North America; also known from Madagascar, Mauritius, and the Seychelles, in Singapore and Java, but evidently only

An important pasture grass in the West Indies, particularly on low moist land. Known as Carpet grass,

64. PASPALUM, Linn. Syst. Nat. ed. x. 855.

Spikelets orbicular to oblong, mostly decidedly plano-convex, falling entire from the short rudimentary pedicels, solitary or paired, secund and abaxial on the dilated or narrow rhachis of spike-like racemes; lower floret barren, reduced to its valve; upper floret \(\). Glumes: the lower typically suppressed, very rarely represented by a small scale; the upper more or less equal to the spikelet, rarely shorter or absent, convex, membranous, 3- or more-nerved. Lower floret: valve very similar to the upper glume, but usually flat or at least less convex, rarely subconcave, the middle nerve sometimes suppressed. Upper floret: valve chartaceous to crustaceous with firm margins, obtuse, emucronate, faintly nerved; valvule subequal to the valve and similar in substance, tightly embraced by the narrowly involute margins of the valve. Lodicules 2, minute, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted near the tip of the floret. Grain tightly enclosed by the slightly hardened valve and valvule, more or less biconvex; scutellum orbicular-elliptic, shorter than half the grain; hilum subbasal, punctiform.—Mostly perennial grasses of varying habit.

Species over 200, mainly in tropical America; few in the Old World.

A polymorphic genus comprising many types of sometimes strikingly different habit, but rather uniform in the structure of the spikelets. Nash in "North American Flora" distinguishes 33 groups.

Spikelets ciliate from the margins of the upper glume, greenish-yellow, $\frac{3}{4} - \frac{2}{8}$ lin. long, tightly appressed to the rhachis of conjugate slender spike-like-racemes ... 1. *P. conjugatum*.

Spikelets not ciliate, quite glabrous or very finely puberulous.

Spikelets quite glabrous, mostly 1-2 lin. long.

Spikelets oblong, rather flattened, up to 2 lin. long, in mostly conjugated slender spike-like racemes, \(\frac{1}{2} - 1\frac{1}{2} \) in. long; culms many-noded with an often long prostrate and rooting base and narrow

long prostrate and rooting base and narrow blades, 1-4 in. by $\frac{1}{2}-1\frac{1}{2}$ lin. ... 2. P. vaginatum.

Spikelets broad-elliptic to suborbicular, conspicuously plano-convex, 1-1½ lin. long (rarely less, to ½ lin.) in racemosely arranged (rarely solitary) spike-like racemes (2-7 or occasionally more); blades up to over 1 ft. long and 2-9 lin. wide.

Blades 6-8 in. by 4-9 lin. wide, more or less rounded at the base; racemes about 3 3. P. auriculatum.

Blades 6-15 in. by 2-4 (rarely 7) lin. wide, very slightly constricted at the base, if at all.

Racemes mostly 2 or 3, rarely 1 or 4, 1-2 (occasion-

Racemes mostly 2 or 3, rarely 1 or 4, 1-2 (occasionally 3) in. long. 4. P. scrobiculatum,

Racemes 4–7 or occasionally up to over 10 (rarely 18), $2\frac{1}{2}$ –4 in. long, often cinnamon-coloured when young

-coloured [var. polystachyum. 4. P. scrobiculatum,

Spikelets minutely pubescent, almost hemispheric, $\frac{5}{8} - \frac{3}{4}$ lin. long in numerous slender fastigiate racemes ... 5. *P. paniculatum*.





1. P. conjugatum, Berg. in Act. Helv. vii. 129, t. 8. Perennial, up to over 2 ft, high, growing in small tufts with often very long rooting runners, throwing up secondary culms from the nodes. Culms erect or geniculately ascending, 5-7-noded, glabrous, internodes more or less exserted, the internodes of the runners usually much compressed and often arching. Leaf-sheaths compressed and keeled, particularly the lower which are more or less flabellately arranged, loose or (the upper) tight, striate, smooth and glabrous except on the upwards ciliate margins and a transverse line of short hairs at the junction with the blade and in the runners, the frequently long and softly bearded nodes; ligules short, membranous, truncate, often with a line of hairs behind them; blades linear-lanceolate to linear, slightly narrowed or rounded at the base, long-tapering to an acute point, up to 7 in. by 3-6 lin., green, soft to almost flaccid, rigidly ciliate and scaberulous along the margins, otherwise glabrous and more or less (rarely very) hairy, midrib fine, whitish, primary lateral nerves about 5 on each side, faint. Spike-like racemes paired (rarely 3-nate), sessile or subsessile or one of them shortly peduncled, divergent, 2-6 in. long; rhachis herbaceous, subtriquetrous, about $\frac{1}{3}$ lin. wide, grooved on the back with smooth cartilaginous lateral angles and a much projecting or sublamelliform facial angle, glabrous except at the pubescent base, internodes \(\frac{1}{4} \) lin. long; pedicels solitary, with thickened tips, curved, \(\frac{1}{4}\) lin. long. Spikelets 2-seriate, not or slightly imbricate, but usually closely packed, broad-elliptic, subobtuse or apiculate to shortly acute, plano-convex, $\frac{3}{4} - \frac{7}{8}$ lin. long, greenish-yellow, at length brownish. Lower glume 0; upper corresponding in size and outline to the spikelet, convex, thinly membranous with a stout green marginal nerve on each side, ciliate, the cilia fine, up to over I lin. long, white. Lower floret: valve very similar to the upper glume and equalling it, but flat and glabrous with more delicate marginal nerves; valvule 0. Upper floret \(\): valve like that of the lower, if not more distinctly apiculate or acute and 3-nerved, thinly crustaceous, straw-coloured; valvule with narrow flaps. Anthers yellow and orange, $\frac{1}{3}$ lin. long. Grain elliptic-rotundate, rather flat, $\frac{1}{2} - \frac{5}{8}$ lin. long; scutellum of similar shape, equalling almost one-third of the grain.— Sw. Prodr. 21, and Fl. Ind. Occ. i. 133; Poir. Encycl. v. 29; Fluegge, Monogr. Gram. 102; Humb., Bonpl. & Kunth, Nov. Gen. & Sp. i. 91; Trin. Gram. Pan. 93, Panic. Gen. 54, and Sp. Gram. Ic. t. 102; Kunth, Rév. Gram. 25, and Enum. i. 51; Steud. Syn. Pl. Glum. i. 21; Hack. in Bolet. Soc. Brot. v. 210; Franch. Contr. Fl. Congo Franç. 31; Durand & Schinz, Consp. Fl. Afr. v. 736, and Études Fl. Congo, 320; Cummins in Kew Bulletin, 1898, 81; Rendle in Cat. Afr. Pl. Welw. ii. 162; De Wild. & Durand, Contr. Fl. Congo, i. fasc. ii. 71, Reliq. Dewevr. 256, and in Bull. Herb. Boiss. 2me sér. i. 60; De Wild. Miss. É. Laurent, 199, Pl. Util. Congo, i. 514, and Études Fl. Bas- et Moyen-Congo, ii. 10; Stapf in Johnston, Liberia, ii. 666;

Nash in North Amer. Fl. xvii. 194; Hitchcock in Contrib. U.S. Nat. Herb. xii. 136; Backer in Teysmannia, xxiv. 366, t. 7. *P. tenue*, Gærtn. Fruct. ii. 2, t. 80. *P. ciliatum*, Lam. Illustr. i. 175; P. Beauv. Fl. Owar. ii. 56, t. 92, fig. 2. *P. africanum*, Poir. Encycl. Suppliv. 314; Kunth, Enum. i. 61; Steud. Syn. Pl. Glum. i. 33. *P. Renggeri*, Steud. l.c. 17. *P. sieberianum*, Steud. l.c. *P. longissimum*, Hochst. ex Steud. l.c. 19. *Digitaria conjugata*, Schult. Mant. ii. 262.

Upper Guinea. Sierra Leone: Kamakuia, Thomas, 296! Sendugu, Thomas, 583! Pendembu, Thomas, 816! Kennema, Thomas, 1605! Njungam, Thomas, 1324! Bumbuna, Thomas, 3342! Yonibana, Thomas, 4803! Sherbro, Hunter, 26! and without precise locality, Welwitsch, 2937 partly! Morson! Liberia: within a radius of 20 miles from Kakatown, Whyte! Gold Coast: Aburi Hills, Johnson, 469! Assim Yan Kumassi, Cummins, 157! 166! Southern Nigeria: Lagos, by water, MacGregor, 122! Dawodu, 344! Opobo, Jeffreys, 31! Abbeokuta, Irving! Ikoyi Plains, Dalziel, 1314! Aboh, Barter, 1388! Ndoni town, Barter, 1763! On the Quorra, Vogel. 3! Old Calabar, Robb! Holland, 116! Cameroons: Lolodorf, Staudt, 200! Bipinde, Zenker, 4298! Barombi, Preuss, 302! Batanga, common in open bush and fields, Bates, 47! 401! and without precise locality, Preuss, 1147! S. Thomé: Boa Nova, Moller, 129! Don! Fernando Po, Vogel! Mann, 119! Prince's Island: in woods at the foot of Pico Papagayo, Welwitsch, 2927!

Island: in woods at the foot of Pico Papagayo, Welwitsch, 2927!

Lower Guinea. Belgian Congo: Monbuttu; Munza, Schweinfurth, 3501!

Boma District; Sisia, Dupuis. Shinganga, Dewèvre. Cataracts District; Kienzei-Lutete, Hens, A 345! Stanley Pool District; Kisantu, Gillet. Kwango District; Eiolo, Laurent. Equator District; Eala, Laurent. Ubangi District; Mokoange, Boucken. Eastern Province; Romee, Van Goezen. Kasai District;

Bwaka, Van Goezen.

Common in the hotter parts of America from the Gulf States southwards; also in the Indo-Malayan region and Polynesia (introduced?).

This grass, which is sometimes called "sour grass" in the West Indies (Grisebach), often forms extensive mats on moist ground, spreading rapidly and covering the ground to the exclusion of everything else. Very acceptable food to cattle and horses (Kew Bulletin, 1894, 385).

2. P. vaginatum, Sw. Prodr. Veg. Ind. Occ. 21. Perennial, 1½-2 ft. high. Culms ascending from a creeping and rooting often very long and branched base, many-noded, sheathed all along or the uppermost internodes shortly exserted. Leaves numerous, distichous, imbricate below, glabrous except at the often bearded mouth of the sheath; sheaths pale, tight, more or less compressed, those of the bases at length withering away, all very smooth; ligules very short, truncate, with fine hairs from behind; blades linear, narrower at the base than the sheath, acute, 1-4 in. by $\frac{1}{2}$ - $1\frac{1}{2}$ lin., spreading, flat or involute, somewhat plump, very closely nerved, nerves of the upper side minutely papillose, midrib very slender, primary nerves hardly differentiated, margins smooth. Inflorescence of 2, rarely 3 spikelike racemes, peduncled on the top of the culm, erect or spreading, particularly the lower; spikes $\frac{1}{2}-1\frac{1}{2}$ in. long, slender, straight or very slightly arched, 2-seriate, dense, glabrous; peduncle from very short to over 4 lin. long, up to $\frac{1}{2}$ lin. wide; rhachis herbaceous, triquetrous, flat on the back, chambered on the face, chambers oblong, up to $1\frac{1}{2}$ lin. long, margins scaberulous, internodes $\frac{1}{2}$ - $\frac{3}{4}$ lin.





long; pedicels reduced to broad dorsally compressed stumps. Spikelets solitary, subsessile, oblong, acute to acuminate, flattened, up to 2 lin, long, imbricate and appressed to the rhachis, pale. Lower glume 0; upper corresponding in shape and size to the spikelet, thinly membranous, quite glabrous, 5- or 4-nerved with the middle nerve suppressed, lateral nerves approximate near the margin. Lower floret reduced to its valve which very much resembles the glume, and is 5-7-nerved with the side-nerves submarginal. Upper floret \lozenge , shorter by one-third or one-quarter than the lower, pale, smooth; valve and valvule subcoriaceous, the former faintly 5-nerved. Anthers \frac{1}{2} lin. long.—Sw. Fl. Ind. Occ. i. 135; Fluegge, Monogr. Pasp. 108; Trin. Gram. Pan. 94, Panic. Gen. 53, and Sp. Gram. Ic. t. 120; Kunth, Enum. i. 52; Steud. Syn. Pl. Glum. i. 20; Small, Fl. S.-E. U. Stat. 78; Hitchcock in Contrib. U.S. Nat. Herb. xii. 136; Hitchcock & Chase in Contrib. U.S. Nat. Herb. xviii. 307; not of P. Beauv. Fl. Owar. P. vaginatum, forma longipes, Lange in Vidensk. Medd. Naturh. Foren. Kjöbenh. 1854, 42, and Pug. Plant. Hisp. i. 28. P. distichum, N. L. Burm, Fl. Ind. 23; Gærtn. Fruct. ii. 2, t. 80; Kunth, l.c.; Steud. l.c., 29; Baker, Fl. Maurit. 431; Benth. Fl. Austr. vii. 460; Hack. in Forschungsr. S.M.S. "Gazelle," iv. 6; Durand & Schinz, Consp. Fl. Afr. v. 737; Hook. f. Fl. Brit. Ind. vii. 12; Rendle in Journ. Linn. Soc. Bot. xxxvi. 319; Ridley, Mat. Fl. Mal. Pen. iii. 124; Stapf in Dyer, Fl. Cap. vii. 371, and in Johnston, Liberia, ii. 666; Merrill in Philipp. Journ. Sc. i. Suppl. i. 346; Backer in Teysmannia, xxiv. 423, t. 9; not of Linn. P. distichum, var. vaginatum, Griseb. Fl. Brit. W. Ind. 541. P. littorale, R. Br. Prodr. 188; Trin. Gram. Pan. 95, and Sp. Gram. Ic. t. 112; Kunth, l.c. 51. P. longiflorum, P. Beauv. Fl. Owar. ii. 46, t. 85, fig. 2; Grah. Cat. Bomb. 234; not of Retz. P. brachiatum, Trin. ex Nees, Agrost. Bras. 62. P. foliosum, Kunth, Rév. Gram. i. 25. P. squamatum, Steud. l.e. 21. P. inflatum, A. Rich. in Ram. de Sagra, Fl. Cub. iii. 298. P. kleinianum, Presl, Rel. Hænk. i. 209; Steud. l.c. 29. P. boryanum, Presl, I.c.; Steud. I.c. Digitaria foliosa, Lag. Gen. et Sp. Nov. 4. D. vaginata, Philippe, Fl. d. Pyrén. ii. 415. D. paspaloides, var. longipes, Lange ex Willk. & Lange, Prodr. Fl. Hisp. i. 45. Sanguinaria vaginata, Bub. Fl. Pyren, iv. 258.

Upper Guinea. Senegal, Roger! Heudelot, 451! Liberia: Monrovia, Naumann, 31. Southern Nigeria: sandy shores of the Nun River, Vogel, 60! Cameroons: in crevices of rocks on the shore, Batanga, Bates, 340! Fernando Po: creeping on the beach, Mann, 441! St. Thomé, Don!

Nile Land. Somaliland: near Burao and on the road to Upper Sheikh, and at Lower Sheikh and Bahindula, Appleton! Socotra, Balfour, 236! 305!

Schweinfurth, 717! Uganda: Unyoro, Speke & Grant!

Lower Guinea. French Gaboon, Jardin. Angola: Loanda, Welwitsch, 7327! Mossamedes; in salt marsh between the Cable Station and the River Bero, Pearson, 2166! 2181!

Mozambique Distr. Zanzibar Island, Sacleux, 1819! German East Africa: Tanga, Holst, 2073! Volkens, 179! Portuguese East Africa: on the Zambesi,

Kirk!

Throughout the tropics of both hemispheres, mostly on the seashore; also

in Galicia (Spain) and the western and central Pyrenees, but no doubt introduced here.

Frequently confused with Paspalum distichum, Linn. (Herb. Linn.!), which has broader and flatter leaves, mostly sessile or subsessile lateral spikes and spikelets with firmer sides and a more convex upper glume, which is appressedly and silkily pubescent. The latter is the plant described in Dyer's Fl. Cap. vii. 370 as P. Digitaria. This name should therefore be replaced in that work by P. distichum, Linn., which will also cover the synonymy quoted there under P. Digitaria except Paspalum Elliottii, S. Wats., the latter according to Hitchcock (in Contrib. U.S. Nat. Herb. xii. 146) being identical with P. furcatus, Fluegge (=Axonopus furcatus, Hitchcock). For further synonyms of P. distichum see Thellung in Fl. Advent. Montpell. 77–83 under P. distichum, subsp. paspalodes, and Nash in North Amer. Flora, xvii. 195.

3. P. auriculatum, Presl, Rel. Hank. 217. Probably perennial, up to over 1½ ft. high. Culms erect, simple or sparingly branched, 4-5-noded, sheathed all along or the upper internodes exserted, rather stout and spongy below, glabrous. Leaves usually quite glabrous except at the appressedly hairy sheath-nodes; sheaths wide, loose, terete or somewhat compressed, but not keeled, striate, smooth; ligules membranous, $\frac{1}{2}$ lin, long, truncate; blades lanceolate-linear, slightly constricted and rounded at the base, tapering to a fine point, 6-8 in. by 4-9 lin., the uppermost often much reduced, soft, flat, margins undulate or crisped downwards, scabrid upwards, lateral primary nerves up to 8 on each side, inconspicuous, midrib slightly prominent below. Inflorescence on a slender peduncle, shortly and terminally or laterally exserted from the uppermost sheath, of 3 racemes, sometimes with an additional raceme from the base of the peduncle; common axis 1-2 in. long, more or less winged upwards with the wings produced into short obtuse auricles at the nodes, glabrous, smooth. Racemes erect or spreading, stout, the lowest peduncled or like the others subsessile, 1\frac{1}{2}-3 in. long; rhachis pubescent at the very base, herbaceous above it, flat on the back, about 1½ lin. wide, thin, with a sharply projecting and sometimes lamelliform midrib on the face and with scabrid margins, internodes about ½ lin. long; pedicels solitary, the lowest terete, all the others very short, flat and broad, sometimes by their wide insertions dividing the face of the rhachis into more or less complete chambers, glabrous. Spikelets typically 2-seriate, crowded, laterally contiguous or subimbricate, broadly ovate- or rotundate-elliptic, sub-biconvex, obtuse or subobtuse, 1½ lin. long, chestnut-brown, quite glabrous. Lower glume 0; upper corresponding in size and outline to the spikelet, very convex, thinly membranous, 5-nerved, the lateral nerves approximate and submarginal. Lower floret reduced to its valve which is flat, membranous and dull brown or cinnamon-coloured, or slightly convex and cartilaginous, glossy and chestnut-brown all over or only in the centre, the sides in this case being dull or pale to whitish, more or less distinctly 7-nerved, with the outermost pair of nerves of each side submarginal. floret \(\): valve very convex on the back, glossy, chestnut-brown



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except at the whitish base and the involute narrow margins, firmly crustaceous, obscurely 5-nerved; valvule with broad slightly overlapping hyaline auricles near the base. Anthers ½ lin. long, yellow.—
P. Zollingeri, Steud. Syn. Pl. Glum. i. 28; Balansa in Journ. de Bot. iv. (1890) 136. P. lamprocaryon, K. Schum. in Engl. Pfl. Ost-Afr. C. 100. P. scrobiculatum, var. auriculatum, Merrill in Philipp. Journ. Sc. i. Suppl. i. 345.

Upper Guinea. Sierra Leone: Bumban, 650 ft., *Thomas*, 1967! Kal-alla, 1200 ft., *Thomas*, 2229! Jigaya, 1100 ft., *Thomas*, 2837!

Nile Land. Niamniam country: Tuhami's Seriba, Schweinfurth, 3786! Uganda: Entebbe, Fyffe, 197! Kirrema Forest, 4000 ft., Dummer, 411! Mozambique Distr. German East Africa: Bukoba, Stuhlmann, 3901.

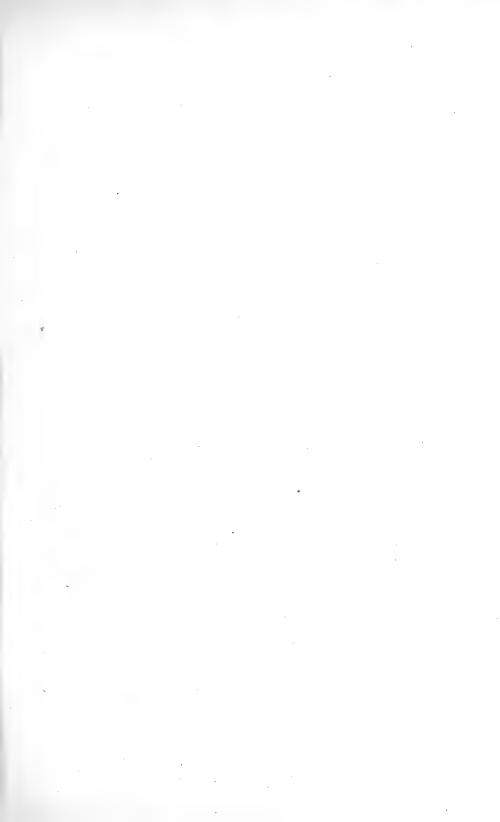
Nyasaland: between Kondowe and Karonga, Whyte!

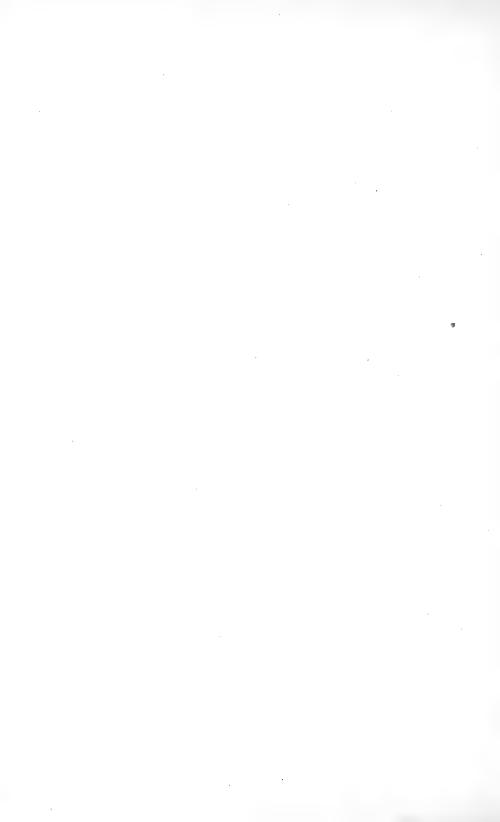
Also in Java, Tonkin and the Philippines.

The valve of the lower floret of the Indo-Malayan specimens is always thinly membranous and flat, but in the African it is more or less cartilaginous or crustaceous and convex, approaching the structure of the valve of the upper floret, a modification frequently observed in other members of the Paspalum scrobiculatum group.

4. P. scrobiculatum, Linn., var. Commersonii, Stapf. Perennial (sometimes flowering the first year or annual?), 1 to over 2 ft. high, usually scantily tufted from a short præmorse rhizome with intravaginal and extravaginal innovations, the latter with appressedly hirsute cataphylls. Culms erect or ascending, sometimes from a prostrate and rooting many-noded base, simple or sparingly branched, 5-noded, terete or slightly compressed below, glabrous, the upper and often also the intermediate internodes more or less exserted. Leaf-sheaths loosely clasping, the lower somewhat compressed and keeled, striate, usually glabrous except the basal which are commonly appressedly (rarely spreadingly) silky-hirsute downwards, rarely softly and loosely hirsute all over; ligules membranous, short, truncate or ovate-rotundate; blades linear to lanceolate-linear from an equally wide or slightly constricted base, up to 9 in. by 5 lin., but usually shorter and narrower (mostly 2-4 lin. wide), the uppermost sometimes much reduced, flat, soft or more or less rigid, quite glabrous or with a scanty beard of white hairs towards the base of the sheath, rarely softly and loosely hirsute all over, margins scabrid. lateral nerves 4-5 on each side, usually inconspicuous, midrib slightly prominent below. Inflorescence of mostly 2, less often 3 or 1, very rarely 4 spike-like racemes, terminal and ultimately more or less exserted from the uppermost sheath, very frequently with an additional raceme from the base of the peduncle, the accessory raceme remaining long or permanently enclosed in the supporting sheath; common axis usually very short if the racemes are paired (rarely up to $\frac{1}{2}$ in. long), longer (up to 1 in., rarely $1\frac{1}{2}$ in.) if there are 3 or 4 racemes, with the uppermost internode very short, or almost as long as the preceding, internodes 2-winged, wings wider upwards and either all or only those of the uppermost internode produced into short obtuse

or (rarely) elongated and acute auricles, glabrous, smooth. Racemes suberect or spreading, straight or arching, moderately stout, the lateral shortly peduncled or more often subsessile, 1-2 (rarely 3) in. long; rhachis pubescent (with some longer hairs added) at the base, herbaceous and glabrous above it, flat on the back, mostly \frac{7}{8}-1\frac{1}{4} \lin. wide, rarely much narrower (to slightly over \frac{1}{2} lin.) or wider (up to 1½ lin.), with a slender but sharply projecting acute straight or zig-zag keel on the face and with scabrid margins, internodes about 1 lin. long; pedicels solitary, the lower subterete, the following flattened dorsally, with acute scaberulous angles, usually slightly curved and placed aslant the wings of the rhachis, often up to their margin, thereby chambering the face of the rhachis more or less completely, glabrous. Spikelets 2-seriate, mostly back to back, laterally contiguous or almost so, rarely both ranks facing more or less one way and subimbricate, broad-elliptic to ovate- or obovateelliptic, rarely almost orbicular, obtuse to subacute, plano-convex, mostly about 1 lin. long, rarely much smaller (to ½ lin.) or much larger (to slightly over 1½ lin.), dull brown, quite glabrous, varying from pale greyish-green or tawny- to umber-brown. Lower glume 0; upper corresponding in size and outline to the spikelet, very convex, thinly membranous, 5-7-nerved, the lateral nerves approximate and submarginal. Lower floret reduced to its valve which is flat, membranous, mostly 5- less often 7-nerved, with the outermost pair of nerves submarginal in the flexure, the additional (intramarginal) pair, if present, often shorter. Upper floret \(\preceq\): valve very convex on the back, glossy, pale to chestnut-brown, firmly crustaceous, obscurely 5-nerved; valvule with the flaps widened into a broad auricle below the middle. Anthers \frac{1}{2} lin. long. Grain rotundate-elliptic, very convex in front, flat on the back, pale; scutellum up to half the length of the grain.—P. Commersonii, Lam. Ill. i. 175, t. 43, fig. 1. P. Kora, Willd. Sp. Pl. i. 332, and Hort. Berol. t. 74; P. Beauv. Fl. Owar ii. 45, t. 85, fig. 1; Roxb. Fl. Ind. ed. Carey, i. 282; Grah. Cat. Bomb. Pl. 234; Duthie, Indig. Fodd. Grass. t. 2, and Fodd. Grass. N. Ind. 1. P. scrobiculatum, Bojer, Hort. Maurit. 361 (partly?); Webb, Spicil. Gorg. 187; Hook. Niger Fl. 557; Miq. Fl. Ind. Batav. iii. 430; Benth. Fl. Hongk. 408, .. and in Fl. Austral. vii. 460 (partly); Baker, Fl. Maurit. 432 (partly); Hack, in Bolet. Soc. Brot. v. 210, and vi. 140; Klatt in Jahrb. Hamb. Wiss, Anst. ix. 120; Cordemoy, Fl. Réun. 114; Ridley in Agr. Bull. Straits and Fed. Mal. St. ii. 275; Durand & Schinz, Consp. Fl. Afr. v. 738, and Études Fl. Congo, 320; K. Schum. in Engl. Pfl. Ost-Afr. C. 100; Franch, Contr. Fl. Congo Franc. 30; Hook, f. Fl. Brit. Ind. vii. 10 (partly); Stapf in Dyer, Fl. Cap. vii. 370; Durand & De Wild, in Compt.-Rend. Soc. Bot. Belg. xxxvi. ii. 90, and Mat. Fl. Congo, i. 44; Rendle, Cat. Afr. Pl. Welw. ii. 162; De Wild. & Durand, Contrib. Fl. Congo, ii. 71, and in Bull. Herb. Boiss. 2me sér. i. 60; Wood, Natal Pl. ii. t. 134; De Wild. Pl. Util. Congo, i. 518-519





(partly); Miss. É. Laurent, 200, and Études Fl. Bas- et Moyen-Congo, ii. 10; Th. & Hél. Durand, Syll. Fl. Congo, 629; Chiov. in Ann. Istit. Bot. Roma, viii. 29, 293; Eyles in Trans. Roy. Soc. S. Afr. v. 299; not of Linn. P. scrobiculatum, var. β, Fluegge, Monogr. Gram. 87; Kunth, Enum. i. 53; Thwaites, Enum. 358, and ex Hook. f. in Trim. Handb. Fl. Ceyl., v. 122. P. scrobiculatum, var. β, Trin. Gram. Pan. 123. P. serobiculatum, var. Jardini, Franch. in Contr. Fl. Congo Franç. 30. P. serobiculatum, var. γ velutinum, Hack. in Engl. Jahrb. vi. 233. P. dissectum, Nees, Fl. Afr. Austr. 15; not of Linn. P. Jardini, Steud. Syn. Pl. Glum. i. 18; Jardin, Herb. Côte Occ. Afr. 4. P. Metzii, Steud. l.c. 21, P. mauritanicum, Steud, I.c. 26. P. borbonicum, Steud, I.c. 27.

Upper Guinea. Cape Verd Islands: S. Jago; valley of Domingo, Hooker, 80! Senegal: Mbohou, near Matam, Chevalier, 2249! Sierra Leone: common near Senegal: Mbohou, near Matam, Chevalier, 2249! Sierra Leone: common near Regent, Scott Elliot, 4188 a! by the Wallia River, Scott Elliot, 4555! and without precise locality, Don! Welwitsch, 2937 partly! 2941! French Guinea: Timbo, common along footpaths and in cultivated ground, Pobéguin, 1704! Baffing valley, by streams, Pobéguin, 1710! Liberia: Monrovia, Naumann, 30. Southern Nigeria: Lagos, in damp situations, Dawodu, 3! Dalziel, 1122! Opobo, Jeffreys, 21!22 a! 25! 25 a! Etoi River, Holland, 287! Old Calabar, Robb! Northern Nigeria: Nupe; in swamps, Barter, 1372! Abinsi, Dalziel, 871! 872! Cameroons: Bipinde, Zenker, 3804! Batanga, by footpaths, Bates, 62! S. Thomé: Caixão grande and Madre de Dios, on the beach, Moller, 130! Don! Fernando Po. Mann. 119 partly! beach, Moller, 130! Don! Fernando Po, Mann, 119 partly!

Nile Land. Eritrea: Sarae; Adi Ugri, 6230 ft., Pappi, 36! 74! Denghel, in swampy ground, Forte. Abyssinia: Gallabat; Matamma, on the banks of streams, Schweinfurth, 1187! Begemeder, Schimper, 1116! Socotra: Galonsir, Balfour, 305! Uganda: in low grassland on hill slopes near Kijude, 4000 ft., Dummer, 2679! in forest clearings near Kipayo, 4000 ft., Dummer, 1041! British East Africa: Nairobi, Dowson, 199! Kithungulu, Gregory! Rabai

Hills, Taylor!

Lower Guinea. French Gaboon, Griffon de Bellay! Belgian Congo: Lower Congo, Smith! Stanley Pool District; Mpie, Vanderyst, 3747! Wombali, Vanderyst, 4543! Cheval Leo Kwam, Laurent; Suata, Buettner; Kinshasa, Laurent; Kisantu, Gillet. Lake Leopold District; Kutu, Laurent. Equator District; Eala, Laurent; Lulanga, Laurent. Bangala District; Demeuse. Angola: Ambriz, Welwitsch, 2892 b! Golungo Alto; Cacarambola, Welwitsch,

Angola: Ambriz, Welwitsch, 2892 b! Golungo Alto; Cacarambola, Welwitsch, 2987! Pungo Andongo; in damp meadows near Sansamanda, Welwitsch, 2794! 2795! in marshy meadows near Muta Lucala, Welwitsch, 2707!

South Central. Belgian Congo: Katanga; Upper Marungu, Debcerst.

Mozambique Distr. Zanzibar, Stuhlmann. German East Africa: Tanga, in meadows, Holst, 2041! Kilimanjaro; Marangu, 5100 ft., Volkens, 645! Usambara; Kwa Mshuza, Holst, 9017! Portuguese East Africa: Quillimane, Stuhlmann; banks of the Zambesi, Carvalho. Lower Buzi River, up to 400 ft., Swynnerton, 1563! Rhodesia: Bulawayo, Monro, 991. Victoria Falls, Rogers, 5719. M'rewa, near water, Appleton, 25! Umtali, Sawer! Salisbury, Mrs. Craster, 17! Inyanga District, Mundy! Gazaland: Melsetter, Swynnerton, 1563! Gont. Herb. 1077: Chirinda. 3700 ft., Swynnerton, 1626! 1563! Govt. Herb. 1077; Chirinda, 3700 ft., Swynnerton, 1626!

Throughout the tropics of the Old World.

This "variety" comprises almost all the spontaneous forms of P. scrobiculatum as understood by most post-linnean authors, the original P. scrobiculatum of Linnæus representing the cultivated forms of India (P. scrobiculatum, var. frumentaceum, Stapf). The other forms commonly referred to this P. scrobiculatum of authors are P. polystachyum, R.Br., with its synonyms, and P. orbiculatum. latum, Forst. The former is treated here as another variety of P. scrobiculatum, whilst the latter is in my opinion a perfectly distinct species of the Polynesian and Indo-Malayan regions with an extension into New Zealand and Australia, and is therefore outside the scope of this work. *P. scrobiculatum*, var. *Commersonii* as defined in this place is a remarkably "variable" group, the final analysis of which can only be undertaken in the field and the experimental plot. Many of its states come probably within the range of individual variation and response to external conditions, whilst others suggest the presence of definite strains or crosses between them.

A state with the leaves hairy all over has been described as P. Jardini by Steudel and as P. scrobiculatum, var. velutinum by Hackel. There seems to be no definite correlation between this and other characters, nor is this condition geographically confined. In fact, glabrous and hairy specimens have been collected side by side (e.g. Hooker's from Domingo Valley in S. Jago, Cape Verd Islands). The size, shape and nervation of the spikelet seem to be subject to similar apparently unaccountable fluctuations, but so that very small $(\frac{1}{2}, \frac{3}{4})$ lin. long) suborbicular spikelets are rather exceptional, whilst the addition of a pair of intramarginal nerves in the lower floret is more common. Another modification consists in the hardening of the valve of the lower floret, whereby it becomes more or less cartilaginous (P. cartilagineum, Presl). This has its parallel in other species of *Paspalum* and of *Brachiaria*. It may extend to all or only to some of the spikelets of an inflorescence, and it occurs altogether erratically. The number of racemes per inflorescence varies from 1 to 4, but 2 is most frequent (52.9 per cent. in 450 inflorescences examined), then come three (with 26.9 per cent.), then one (10.9 per cent.) and 4 (9.1 per cent.); but whilst 2- and 3-racemed inflorescences may be considered to mark the normal range throughout the area, 1-racemed inflorescences are by far the commonest in Eastern Africa (from the Red Sea to Natal and in the Mascarene Islands) and 4-racemed inflorescences are met with mainly in West Africa from Lagos to the Congo. This polymorphism is further enhanced by a considerable diversity of habit-stiffly erect and semi-prostrate, tall and stunted, scantily tufted and heavily bunched and leafy specimens.

P. scrobiculatum is regarded as a fodder grass of some value (Duthie, Appleton) and is said to constitute the only pasture in the Sende district in the Belgian Congo (Stanley Pool Distr.), but it ought to be stated that in India suspicious cases of cattle poisoning have been connected with this grass.

Var. polystachyum, Stapf. Usually a taller and stouter plant than var. Commersonii, up to over 4 ft. high; culms 5-9- (mostly 6-) noded and usually sheathed all along; leaves commonly quite glabrous, very rarely loosely hirsute, blades up to over 1 ft. by 7 lin., the longest of a culm mostly 9-12 in. by 4 lin.; inflorescences of 4-7, less often up to 10, very rarely up to 18 racemes, their peduncles always overtopped by the uppermost leaf and not or very shortly exserted from its sheath during flowering, very rarely with an accessory reduced inflorescence from the axil of the last sheath or last but one; common axis rarely over 2 in. long, often very much shorter; racemes $2\frac{1}{4}$ -4 in. long or the weakest of an inflorescence shorter, their ranks mostly facing almost one way; rhachis 1-1\frac{1}{4}\text{ (rarely } 1\frac{3}{4}\text{) lin. wide; spikelets broad-elliptic to suborbicular in outline, usually very obtuse, 1-1\frac{1}{4}\text{ lin. long, cinnamon-colour to olive-brown, at length darkening.—P. firmum, Trin. Gram. Pan. 105, and Sp. Gram. Ic. 125; Kunth, Enum. i. 60; Steud. Syn. Pl. Glum. i. 28. P. scrobiculatum, Benth. in Hook. Niger Fl. 557 (partly); Durand & Schinz, Etudes Fl. Congo, 320 (partly); Durand & De Wild. Mat. Fl. Congo, i. 44; not of Linn. P. scrobiculatum, var., Pobéguin, Ess. Fl. Guin. Franç. 215. P. scrobiculatum, var. polystachyum, Cheval. Sudania, 33.

Upper Guinea. Sierra Leone: Pendembu, 300 ft., Thomas, 740! Makump, 400 ft., Thomas, 966! Mabam, 370 ft., Thomas, 1580! French Guinea: Kouroussa, Pohéguin, 487! Middle Niger: Mande Country; Nafadie, Chevalier, 2250! Southern Nigeria: Opobo, Jeffreys, 22!25! Awka District; Agolo, Obu, Thomas! Nun River, Vogel, 51! Mann, 535! Idu, New Calabar, Holland, 132! Onitsha, Macleod! Northern Nigeria: Lokoja District, Richardson! Buruta, common in marshy ground near the Niger, Parsons! Nupe; in swamps,



Paspalum.] CLVII. GRAMINEÆ (Stapf).

Barter, 1230! Abinsi; common in damp places, Dalziel, 871 (partly)!

Cameroons; Bongolo, Macleod!

Nile Land. Jur: Ghattas' Great Seriba, Schweinfurth, 2119!

Lower Guinea. Belgian Congo: Cataracts Div.; Banzu Manteka, in sandy places, Hens, A 208! Stanley Pool Div., on sandbanks near Muschie, Vanderyst, 3979!

Mozambique Distr. Zanzibar Island, Last! Portuguese East Africa: between Shupanga and Sena, and at the Kongone mouth of the Zambesi, Kirk!

5. P. paniculatum, Linn. Syst. ed. 10, ii. 855. Perennial, up to over 3 ft. high, from a short rhizome covered with coarsely hirsute cataphylls or their remains; innovations extravaginal, stout. Culms erect or geniculately ascending, simple, usually 3-noded, glabrous, compressed below. Leaves more or less hirsute, hairs frequently tubercle-based; sheaths more or less keeled, striate, the lower laterally compressed, the uppermost slightly inflated, all bearded at the nodes; ligules membranous, truncate, very short; blades linear-lanceolate to linear, tapering to a fine point, 3-13 in. by 4-7 lin., soft, flat, margins smooth, cartilaginous, often crisped or wavy, lateral nerves 5-7 on each side, midrib slightly prominent below; indumentum of young leaves rather dense and soft. Panicle subfastigiate, contracted or ultimately open and broad-ovate, 3-6 in. by 3-4 in., of 10-20 scattered or irregularly approximate racemes at first erect but ultimately spreading; common axis terete or angular, almost glabrous or more or less hairy towards the nodes. Racemes slender, dense, 4- or by partial abortion 2-ranked, $1-3\frac{1}{2}$ in. long; rhachis triquetrous, up to ½ lin. wide, straight, lateral angles with narrow herbaceous wings, bearded at the base, otherwise glabrous or nearly so, internodes $\frac{1}{2}$ $\frac{3}{4}$ or sometimes 1 lin. long, often alternately longer and shorter and then the pedicels approximate; pedicels 2-nate, unequal, the longer up to $\frac{1}{2}$ lin. long, filiform, sometimes with a few hairs near the tip. Spikelets imbricate, rotundate-elliptic in outline, almost hemispheric, plano-convex, obtuse or subapiculate, $\frac{5}{8}$ lin. long, straw-coloured to purplish-brown, often dark. Lower glume 0; upper corresponding in size and outline to the spikelet, very convex, thinly membranous, pubescent, 3-nerved. Lower floret reduced to a more or less flat valve, very similar to the upper glume but with the lateral nerves submarginal. floret as long as the lower and similar in outline but very obtuse; valve and valvule firmly papery to crustaceous, pale, the latter with broadly auricled flaps. Anthers purple, up to $\frac{2}{5}$ lin. long. Styles deep purple.—Linn. Sp. Pl. ed. ii. 81; Willd. Sp. Pl. i. 331; Gærtn. Fruct. ii. 2, t. 80, fig. 2; Flügge, Monogr. Gram. 180; Nees, Agrost. Bras. 72; Trin. Gram. Pan. 104, Pan. Gen. 50, and Sp. Gram. Ic. t. 127; Kunth, Enum. i. 59; Steud. Syn. Pl. Glum. i. 18; Franch. Contrib. Fl. Congo Franç. 31; Rendle in Cat. Afr. Pl. Welw. ii. 161; Nash in N. Amer. Fl. xvii. 189; Hitchcock in Contrib. U.S. Nat. Herb. xii. 116; Hitchcock & Chase in Contrib. U.S. Nat. Herb. xviii. 316. P. hemisphericum, Poir. Encycl. v. 31.

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P. compressicaule, Raddi, Agrost. Bras. 29.
P. multispica, Steud. l.c. 18.
P. guineense, Steud. l.c.; Jardin, Herbor. Côte Occ. Afr. 4, and Aperçu Fl. Gabon, 15.
P. cognatissimum, Steud. l.c.
P. affine, Bello in An. Soc. Esp. Hist. Nat. xii. 125.
Panicum paniculatum, O. Kuntze, Rev. Gen. iii. Pl. 363.

Upper Guinea. Cameroons: Bipinde, Zenker, 4026! and 4299! without precise locality, Miss Kingsley! St. Thomas Island: Caixão Grande and Madre de Deus, on the shore, Moller, 130! Roça Ledoroma, Mocquerys, 17! Princes Island, Barter, 1967! Rattray! in dense damp woods, Pico de Papagaio, Welwitsch, 2929!

Lower Guinea. French Gaboon, Jardin, 23!

Tropical America, from Mexico and the West Indies southwards.

65. STENOTAPHRUM, Trin.; Benth. et Hook. f. Gen. Pl. iii. 1108.

Spikelets lanceolate to ovate-oblong, falling entire (sometimes tardily) from the rudimentary pedicels, solitary or 2-5, rarely more, abaxial on the triquetrous rhachis of very short spike-like racemes, more or less sunk in hollows or chambers on the anterior face of a dorsally flattened herbaceous or spongy continuous or jointed common axis, or the longer racemes at least closely appressed to it; lower floret of or reduced to an empty valve; upper floret \overline{\overline{\Sigma}}. Glumes dissimilar, the lower mostly minute, scale-like, the upper almost or quite equalling the spikelet and 5-7- (rarely more-) nervedor similar, and then both small, scale-like. Lower floret: valve corresponding in size and shape to the spikelet as seen from the front, chartaceous to coriaceous, 3-7- (rarely more-) nerved, nerves sometimes very obscure; valvule, if present, almost as long as the valve, 2-keeled. Upper floret: valve chartaceous to subcoriaceous with firm margins, faintly 3-5-nerved; valvule subequal to the valve and similar in substance, tightly embraced by the narrowly involute margins of the former, faintly 2-nerved. Lodicules 2, quadratecuneate. Stamens 3. Styles free or almost so, very slender; stigmas long, slender, laterally exserted. Grain broadly ellipticoblong, dorsally compressed, plano-convex; hilum punctiform, basal; embryo up to half the length of the grain.—Creeping or prostrate perennials or tufted erect annuals; sheaths more or less, often strongly, compressed, blades acute or obtuse. False spikes terminal and often also lateral from the upper leaves, peduncled, tough or at length breaking up at the joints.

Species 7, mainly on the shores of the tropical and subtropical seas, 4 confined to Madagascar and the neighbouring islands.

Rhachis entire, spongy, often deeply excavated on the anterior side for the reception of the 1- or plurispiculate racemes 1. S. secundatum.





Rhachis winged, wings alternately to the right and the left of the wavy midrib, herbaceous-membranous, produced upwards into a broad acute tooth or lobe; racemes appressed to the wings 2. S. dimidiatum.

1. S. secundatum, O. Kuntze, Rev. Gen. Pl. ii. 794 (secundum by error). Perennial, of the same growth as S. dimidiatum, but rather coarser and more glaucous. Leaf-sheaths very much compressed and keeled, firm, pallid, quite glabrous or ciliate upwards; ligule a fringe of very short hairs; blades folded in vernation, then flat or with the margins inrolled, the lower often standing off at right angles, linear from a much constricted and rounded base, with obtuse or rounded tips, from less than 1 to 4 (rarely over 6) in. by 2-4½ lin., more or less rigid, glaucous, glabrous, scabrid on the margins towards the tip, otherwise smooth, midrib very slender, nerves very close and numerous, faint or obscure on the upper side. False spikes terminal and very often lateral (1 or 2) from the upper leaves, erect, stout, stiff or curved, 1-3 (rarely 4) in. long, borne on rather stout glabrous peduncles, the latter permanently enclosed in or shortly exserted from the uppermost sheath; common axis linear, entire, stout and spongy, flat on the back with or without oblique transverse depressed lines marking off the internodes, chambered or often deeply hollowed out in front, $1\frac{1}{2}$ - $3\frac{1}{2}$ lin. wide, and up to $1\frac{1}{2}$ lin. thick. Racemes sessile, 3- (rarely more-) to 2-spiculate or reduced to a single spikelet with or without an empty rhachis appressed to its outer side, distant by less than their own length (except sometimes the lowest), completely sunk in the hollows of the rhachis or, if 3-spiculate, shortly exserted from it; rhachis triquetrous, ending in an often sharp point, shorter than the uppermost spikelet, or equalling or exceeding it if 1-spiculate, angles smooth below, scabrid upwards; pedicels reduced to a short stump. Spikelets if more than 1 laterally contiguous or subcontiguous, lanceolate-oblong to oblong, acute or subacuminate, about 2½ lin. long, pallid. Glumes very dissimilar; lower a whitish nerveless membranous to chartaceous ovate obtuse rounded or truncate scale, \frac{1}{2}-1 lin. long, very finely rough; upper glume convex or boat-shaped, obliquely lanceolate in profile, acute, as long as the spikelet or almost so, membranous, 7-nerved, quite glabrous. Lower floret A: valve corresponding in outline and size to the spikelet as seen from the front, chartaceous to subcoriaceous, 7-9-nerved, flattened on the back, slightly rough upwards; valvule slightly shorter than the valve. Upper floret &, similar to the lower but more lanceolate and more acute; valve and valvule chartaceous, smooth, the former 5-nerved. Anthers up to 1½ lin. long. Stigma up to over $1\frac{1}{2}$ lin. long.—Hitchcock & Chase in Contrib. U.S. Nat. Herb. xvii. 271, and xviii. 356. S. glabrum, Trin. Fund. 176 (excl. syn.), Gram. Pan. 60, Pan. Gen. 102, and in Mém. Acad. St. Péters. 6me sér. iii. 190 (partly); Nees in Linnæa, vii. 273; Steud. Syn. Pl. Glum. i. 118 (excl. the two last syn.); Stapf in Dyer, Fl. Cap. vii. 438. S. glabrum, a americanum, Doell in Mart. Fl. Bras. ii. ii. 300,

t. 39. S. americanum, Schrank, Plant. Rar. Hort. Monac. t. 98, fig. 8; Kunth, Enum. i. 138; Hack. in Bolet. Soc. Brot. v. 211; Blanchet, Cat. S.-O. France, 156; Husnot, Gram. 12; Cavara in Bull. Soc. Bot. Ital. 1904, 365. S. swartzianum, Nees, Fl. Afr. Austr. 62. S. sarmentosum, Nees, Agrost. Bras. 93. S. dimidiatum, Durand & Schinz, Consp. Fl. Afr. v. 787 (partly); Franch. Contr. Fl. Congo Franç. 56; Fiore, Fl. Anal. Ital. iv. i. 13. S. dimidiatum, vars β and γ , Brongn. Bot. Voy. Coq. 127. S. dimidiatum, var. americanum, Hack. in Anal. Musc. Nac. Buenos Aires, xxi. 57. R. tripsacoides, Lam. Ill. i. 205, t. 48, fig. 1 b. Ischæmum secundatum, Walt. Fl. Carol. 249. Rottbællia dimidiata, Thunb. Prodr. 23, and Fl. Cap. ed. Schult. 118; not of Linn. f. R. stolonifera, Poir. Encycl. vi. 310. R. compressa, Beauv. Agrost. 176, t. xxi. fig. 8; not of Linn. f.

Upper Guinea. Ivory Coast: on the shore near Tabou, Chevalier, 20055! Gold Coast; shore near Halfa Assinie, Chipp, 274! Southern Nigeria: Opobo, Jeffreys, 18! sandy banks of the Nun River, Barter, 1960! Cameroons: often forming the principal part of the "beach tangle" near Batanga, Bates, 38! St. Thomas Island: on the beach near S. Thomé, Moller, 146! Princes Island, Mann, 529!

Lower Guinea. Gaboon, Griffon du Bellay. Angola; near Loanda,

Gossweiler, 132!

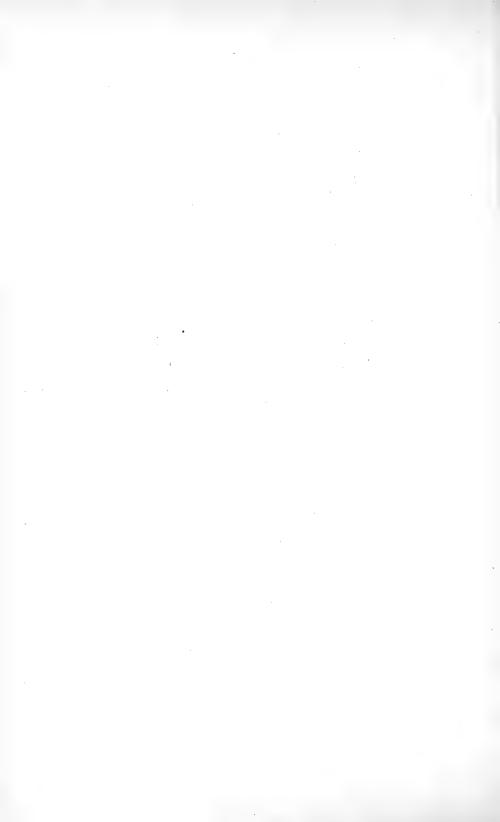
Also in South Africa from Cape Town to Natal, on the American shores of the Atlantic from S. Carolina to the La Plata and in the Pacific from Southern Mexico to Australia; introduced into Southern France and Italy.

The "St. Augustine grass" of the Americans; an excellent pasture grass, also

used for making coarse lawns.

2. S. dimidiatum, Brongn. Bot. Voy. Coq. 127 (excl. vars. $\beta \& \gamma$). Perennial with a rather slender branched closely noded knotty rhizome. Culms ascending from an often long trailing base which is rooting and branching from the numerous nodes, the branches either also trailing or more usually forming fan-shaped bunches of leaves which may remain barren or grow out into secondary few- (mostly 1-2-)noded erect or shortly ascending secondary culms, rising from a few inches to over 1 ft. above the ground; all the internodes, but particularly those of the base, strongly compressed, glabrous, smooth. Leaf-sheaths very much compressed, keeled, the lower pallid, soon diverging and more or less persistent, all glabrous or ciliate upwards, very rarely loosely hairy all over; ligule a fringe of very short hairs; blades folded in vernation, then flat, exactly linear from a shortly contracted base, with subobtuse or rounded tips, 1-5 (rarely to 7) in. by 2-6 lin., green, glabrous, scabrid along the margins towards the tip, otherwise smooth, midrib and the very close and numerous nerves very fine. False spikes solitary, terminal on the primary and secondary culms, rarely with an additional spike from the last sheath but one, $1\frac{1}{2}$ -5 (rarely more) in long, borne on an ultimately long-exserted rather slender glabrous peduncle; common axis glabrous, with a more or less wavy stout midrib, flat on the back and acutely keeled on the face, the lateral angles of its internodes, the intermediate of which are 21-4 lin. long, alternately herbaceously





marginate and herbaceously winged, with the wing produced into a short or long lanceolate acute tooth or lobe, or both lateral angles winged but with the wings alternately narrower and wider and the latter only toothed or lobed or (lowest internodes) only marginate, margins scabrid, the whole rhachis therefore when seen from the back ribbon-like, alternately lobed or toothed or entire downwards, $1-2\frac{1}{2}$ lin. wide, and, seen from the face, more or less distinctly chambered, the chambers alternately to the right and the left of the midrib. Racemes sessile, sunk in the chambers or shortly exserted from them, mostly 3-5- (rarely 2- or 6-8-)spiculate, 2\frac{1}{2}-5 (rarely 6) lin. long, distant by their own or less than their own length or the lowest remote; rhachis wavy or zig-zag, ending in a subulate point, triquetrous, flattened, with the lateral angles marginate or more or less winged downwards, internodes less than 1 lin. long, glabrous or more or less ciliate downwards; pedicels reduced to very short sometimes ciliate stumps. Spikelets if more than 3 more or less 2-seriate and laterally contiguous or imbricate, lanceolate-oblong, subacuminate to acutely acuminate, 2-2\frac{1}{4} lin. long, pallid. Glumes very dissimilar: lower a whitish nerveless membranous to chartaceous ovate obtuse or rounded scale, $\frac{1}{2}$ lin. long, finely asperulous and more or less ciliolate on the top; upper glume very convex to boatshaped, semi-ovate or semi-elliptic in profile, acute, usually slightly shorter than the spikelet, membranous, typically 7-, but sometimes up to 9- and even 11-nerved, glabrous or ciliolate towards the tip. Lower floret A: valve corresponding in outline and size to the spikelet as seen from the front, more or less coriaceous, often very much so, and then the 5 (rarely 7) nerves very obscure or invisible except in the acumen, glabrous or ciliolate near the tip; valvule somewhat shorter than the valve. Upper floret \(\otimes \), as long as the lower or very slightly shorter; valve and valvule lanceolate, acute or acuminate, thinly chartaceous, smooth, glabrous or more or less ciliolate upwards, the former 5-nerved, the latter 2-nerved with rounded sides; stigmas rather large.—Nees, Fl. Afr. Austr. 63; Durand & Schinz, Consp. Fl. Afr. v. 787 (partly); K. Schum. in Engl. Pfl. Ost-Afr. C. 106 (partly). S. complanatum, Schrank in Bot. Zeit. 1824, ii. Beil. 26; Kunth, Enum. i. 137; Nees, Agrost. Bras. 93; Thwait, Enum. Pl. Zeyl. 361; Baker, Fl. Maurit. 440; Balf. f. Bot. Rodrig. 83; Hook. f. in Trim. Handb. Fl. Ceyl. v. 172. S. madagascariense, Kunth, Rev. Gram. ii. 211, and Enum. i. 524, Suppl. 99; Steud. Syn. Pl. i. 118. S. swartzianum, Peters, Reise Mossamb. ii. 549; not of Nees. Panicum dimidiatum, Linn. Sp. Pl. ed. i. 57 (excl. syn.), and Mant. ii. 323; N. L. Burm. Fl. Ind. 25, t. 8, f. 3 (excl. syn.; figure bad); Retz. Obs. vi. 23; Willd. Sp. Pl. i. 339; Roxb. Fl. Ind. i. 287. P. powforme, Boj. Hort. Maurit. 365 (name), not Willd. Rottbællia dimidiata, Linn. f. Suppl. 114, not of Thunb. R. complanata, Sw. in Berl. Ges. Nat. Freunde Mag. iv. (1810), 89, t. 5; Boj. Hort. Maurit. 372.

Mozambique Distr. Zanzibar, Last! Dowson, 120! Pemba Island, Dowson, 120! Lyne, 112! Portuguese East Africa: Kongone Island, mouth of Zambesi,

Also in Madagascar and the neighbouring islands of the Indian Ocean and in Ceylon and the Southern Deccan.

This ought to be as useful for making lawns in the tropics and for fodder as S. secundatum. In fact, its softer and greener foliage would seem to render it preferable.

66. PASPALIDIUM, Stapf.

Spikelets ovate to ovate-oblong or ovate-lanceolate (when seen in front view), awnless, convex to very convex on the back, flattened or slightly depressed on the face, turgid or dorsally moderately compressed, falling entire from the pedicels, solitary, secund and abaxial on the triquetrous sometimes herbaceously marginate rhachis of slender sessile spiciform racemes; lower floret 3, with a usually well-developed valvule, or reduced to the valve. Glumes mostly dissimilar and very unequal in length, the lower reduced to a small scale or up to (rarely over) half the length of the spikelet, upper mostly almost equalling the spikelet, 5-7-nerved with the nerves evenly distributed, rarely both glumes much reduced. Lower floret: valve similar to the upper glume with the inner side-nerves more distant; valvule if present only slightly shorter than the valve with well-developed inflexed flaps. Upper floret: valve oblong to elliptic in outline, acute to apiculate, emucronate, crustaceous, with firm involute margins, faintly 5-nerved; valvule almost as long as the valve, 2-keeled, its sides tightly embraced by the valve all along, of the same texture as the latter. Lodicules 2, small, broadly cuneate. Stamens 3. Styles distinct; stigmas plumose, laterally exserted from the upper part of the spikelet. Grain tightly enclosed by the more or less hardened valve and valvule.—Perennial, semiaquatic or terrestrial grasses; blades linear, flat or involute, sometimes obtuse; ligules reduced to a ciliolate rim; racemes sessile or subsessile and secund on the alternate notches of a triquetrous common axis of a false compound spike, rigid, appressed or subappressed to the more or less hollowed-out flanges of the latter, the lower frequently shorter than the adjacent internodes, the following equalling or exceeding them, but not very much longer; rhachis ending in a subulate point; spikelets mostly conspicuously 2-seriate and laterally contiguous or subcontiguous, nearly always quite glabrous.

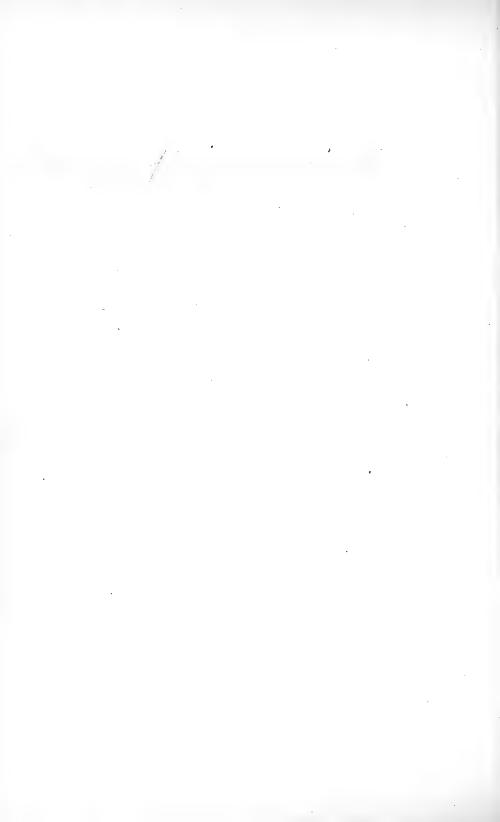
Species about 12 in the warm countries of both hemispheres, but mostly in the Old World; 6 confined to Australia and New Caledonia.

Culms usually stout, more or less spongy, the prostrate bases copiously rooting from the nodes, sheaths and blades somewhat succulent; rhachis of racemes $\frac{1}{3} - \frac{1}{2} \lim$. wide, ciliolate; spikelets very pale, 1 lin. long, with a small whitish truncate almost nerveless outer glume; a hygrophytic grass

... 1. P. geminatum.

a hygrophytic grass \dots \dots \dots \dots \dots Culms rather slender, firm, the prostrate bases trailing, not rooting; sheaths and blades thin, but firm; rhachis





of racemes $\frac{1}{5}$ lin. wide, scaberulous; spikelets often purplish, $\frac{1}{4} - \frac{1}{2}$ lin. long, with a broad-ovate 3-nerved outer glume, equalling $\frac{1}{3} - \frac{1}{2}$ of the spikelet; a xerophytic grass 2. P. desertorum.

1. P. geminatum, Stapf. Perennial, with long creeping or floating more or less spongy many-noded simple or branched stolons, which give rise to solitary or sparingly fascicled culms, more rarely densely exspitose. Culms ascending often from a long prostrate rooting base or sometimes erect, usually branched downwards, 5- to many-noded, rather stout and spongy, upper internodes often exserted from the sheaths. Leaves quite glabrous; sheaths rather loose, terete, very smooth, the lower often somewhat spongy and very finely striate, often slipping off the culm; ligules reduced to a finely ciliate rim; blades linear from a more or less equally wide base, tapering to an acute point, from a few inches to almost 1 ft. long, 11-4 lin. wide, flat or involute, pale green to glaucous, somewhat succulent, very finely rough on the upper side, otherwise smooth, nerves numerous and close, slightly prominent on the upper side, midrib slender. False compound spike slender, erect, from a few inches to almost 1 ft. long, of numerous erect or subcrect and appressed or subappressed spike-like racemes, and terminating with such a raceme; common axis green, triquetrous, flat or keeled on the back, lateral angles marginate, scabrid, facial angle much projecting, wavy. Racemes sessile, straight, slender, 2-seriate, the lowest ½ to over 1 in. long, usually simple, and distant by their own or more than their own length, the following very gradually shorter and more approximate, those just below the terminal often very short and crowded; rhachis straight or slightly wavy, produced into a short point beyond the uppermost spikelet, triquetrous, $\frac{1}{3}$ lin. wide, flat on the back, angles marginate, scabrid or (particularly the lateral which are also wider and more herbaceous) ciliolate; internodes about \(\frac{1}{2}\) lin. long; pedicels solitary, reduced to very short stumps with subdiscoid tips. Spikelets numerous, slightly imbricate, ovate (in front view), acute or apiculate, 1 lin. long, very pale and quite glabrous and smooth. Glumes very dissimilar; the lower a whitish truncate cuff-like scale, \frac{1}{4} lin. long, membranous, very obscurely and shortly 3-5-nerved or apparently nerveless; upper convex, broad-elliptic, almost as long as or distinctly shorter than the fertile floret, obtuse to subacute, membranous, 5-nerved, with nerves anastomosing upwards. Lower floret 3: valve corresponding in length and outline to the spikelet, very similar to the upper glume, but flattened or slightly depressed on the back, with the inner side-nerves more distant; valvule as long as the valve, broadly elliptic-oblong, minutely truncate; anthers 3 lin. long. Upper floret slightly shorter than the lower, ⋈, elliptic in outline, obtuse to subacute, ultimately pale brown: valve and valvule crustaceous, very obscurely transversely rugose, shining,

the former faintly 5-nerved.—Panicum geminatum, Forsk. Fl. Ægypt.-Arab. 18; Aschers. & Schweinf. Ill. Fl. Egypt, 159; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 19; Durand & Schinz, Consp. Fl. Afr. v. 750; Hack, in Bull, Herb, Boiss, iv. App. iii. 14; Chiov. in Ann. Istit. Bot. Roma, viii. 34, 304; and Result. Scient. Miss. Stefanini-Paoli, Bot. 184, 226; Hitchcock & Chase in Contrib. U.S. Nat. Herb. xv. 30. P. fluitans, Retz. Obs. iii. 8, and v. 18; Willd. Sp. Pl. i. 338; Kunth, Enum. i. 78; Steud. Syn. Pl. Glum. i. 59; Schweinf. Beitr. Fl. Aethiop. 300; Mig. Fl. Ind. Bat. iii. 455; Baker, Fl. Maurit. 433; Durand & Schinz, l.c. 749; Chiov. l.c. 34; Cheval. Sudania, 25. P. brizoides, Lam. Ill. i. 170; not of Retz. P. paspaloides, Pers. Syn. i. 81; Kunth, Enum. i. 77; Trin. Pan. Gen. 241; Steud. l.c. 60; Webb & Berth. Hist. Nat. Canar. iii. 383, t. 245; Boiss. Fl. Or. v. 436; Balfour, f. Bot. Socotra, 310; Hook. f. Fl. Brit. Ind. vii. 30, and in Trimen, Handb. Fl. Ceyl. v. 135. P. beckmanniæforme, Mikan ex Trin, in Spreng, Neue Entdeck, ii. 83; Spreng. Syst. i. 309. P. truncatum, Trin. Diss. ii. 130, and Sp. Gram. Ic. t. 168. P. affine, Nees, Agrost. Bras. 113. P. brizæforme, Presl, Rel. Hænk. 302; Steud. i. 60. P. numidianum, Sieb. ex Schult. Mant. ii. 267; not of Lam. P. carnosum, Salzm, ex Steud, l.c. P. appressum, Doell in Mart. Fl. Bras, ii.ii. 184. P. glomeratum, Buckl. Prel. Rep. Geol. Agr. Surv. Tex. App. 3; not of Moench. P. turgidum, Cheval. Sudania, 25. Paspalum appressum, Lam. Ill. i. 176. Digitaria appressa, Pers. l.c. 85. D. affinis, Roem. & Schult. Syst. ii. 470.

Upper Guinea. Cape Verd Islands: St. Jago; in a tank near Trinidade, Lowe! S. Nicolao; by a stream in the Ribeira d'Agoa, Bolle! French Sudan:

Lowe! S. Nicolaō; by a stream in the Ribeira d'Agoa, Bolle! French Sudan: on dunes and in marshes near Timbuctu, Chevalier, 1221! 1230! 1231! Gold Coast: Cape Coast Castle, Vogel, 54! Northern Nigeria: Sokoto, abundant in small streams, Dalziel, 484! Bornu; shore of Lake Tchad, Elliott, 160!

Nile Land. Eritrea: Habab; Oghet-el-Ain, Terracciano & Pappi, 1620. Samhara; Mkullo, near Massaua, Schweinfurth, 236. Dogali, Schweinfurth, 258. Assab, Ragazzi. British East Africa: south of Taveta, 2500 ft., Höhnel, 161! lake edge at Kisumu, Dummer, 1825! Socotra: near Katheng, Schweinfurth, 689! Galonsir and elsewhere, Balfour, 225! 323! Italian Somaliland: Torda Plains, near the mouth of the Jub River, Paoli, 310. Merca, Provenzale.

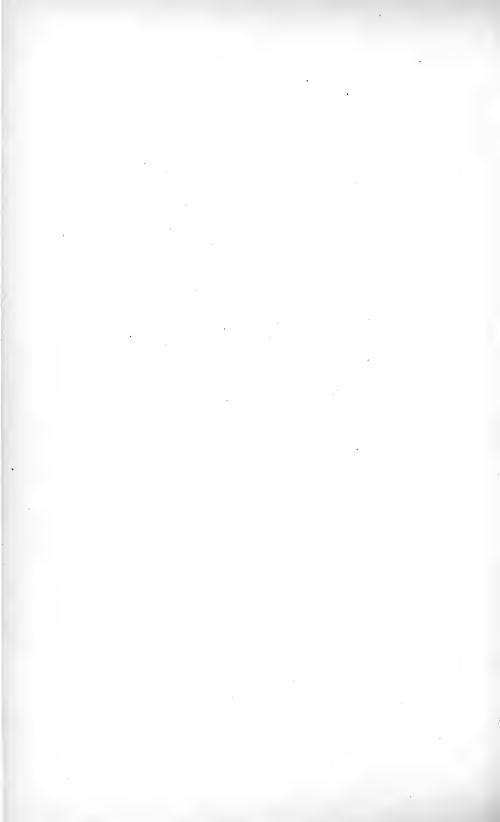
Lower Guinea. South Angola; Rio Corocca, Newton or Capella e Ivans (?)! in the bed of the Bero River, near the mouth, Pearson, 2173! Hereroland:

without precise locality, Höpfner, 77.

Mozambique Distr. German East Africa: Usambara; in rice fields near Amboni, Holst, 2736! Portuguese East Africa: island in Luabo River, Kirk! Nyasaland: Nyika plateau; Moawemba, 7000 ft., McClounie, 7! and without precise locality, Buchanan, 1295!

Chiovenda (in Ann. Istit. Bot. Roma, viii. 305) also enumerates "Panicum geminatum" from Amasen (Pappi, 3209, 3460, 3476, 3891, and Tellini, 1484), Beni Amer (Pappi, 6961) and Baza, by the Mareb River, 2800–2900 ft. (Pappi, 6829, 6887, 6928), adding that it occurs in two forms which in their extreme states are very different, the differences being, however, entirely due to the amount of water available for the plant. If growing in the water the stems become spongy, root readily from the nodes, and the whole plant is green. In arid sunny situations, however, the stems are hard, the nodes are widened into corky annular swellings and the whole plant is decidedly glaucous. May not some of the specimens of the second form belong to P. desertorum?





2. P. desertorum, Stapf. Perennial, tufted (often densely so) from a hard creeping or præmorse rhizome with extravaginal innovations covered with glabrous smooth cataphylls. Culms usually ascending, sometimes trailing, and, if so, then generally not rooting from the more or less swollen nodes, but throwing up leafy branches and secondary culms, rather slender, terete, firm or hard although not quite solid, many- or (the secondary) few-noded, the internodes of the barren shoots sheathed all along, the upper of flowering culms more or less exserted. Leaves quite glabrous, very glaucous; sheaths terete or somewhat compressed and keeled, tight, very smooth, the lowest tough and often long-persistent; ligules reduced to a ciliolate rim; blades narrowly linear from an equally wide base, tapering to a fine point, from 1-9 in. by $1\frac{1}{2}-2\frac{1}{2}$ lin., flat or involute, or sometimes folded, subflaccid or slightly rigid, smooth, nerves numerous, fine, the primary lateral and the midrib slightly differentiated. Inflorescences solitary, terminal, rarely with 1-3 additional ones from the uppermost nodes, erect, from 1 to over 6 in. long, of a varying number of appressed or subappressed spike-like racemes, distant below, approximate upwards, often gathered there together with the terminal raceme into a dense false spike; common axis slender, subterete at the base, channelled adaxillarily, gradually becoming trigonous upwards, glabrous, smooth. Racemes sessile, straight, slender, 2-seriate, the lowest in tall specimens over 1 in. long, the following gradually, the uppermost rapidly decreasing in length, often only 3-2 lin. long; rhachis very slender, rigid, triquetrous, wavy, 1 lin. wide, angles finely marginate, scaberulous, internodes less than \frac{1}{2} lin. long, pedicels extremely short, with subdiscoid tips, Spikelets numerous, laterally contiguous, rarely subimbricate, ovate to ovate-oblong, acute to subacute, $1\frac{1}{4}-1\frac{1}{2}$ lin. long, glaucous or more often tinged with purple, quite glabrous and smooth. Glumes very dissimilar; lower broad-ovate, subacute or obtuse, more rarely rounded or truncate, up to \(\frac{3}{4}\) lin. long, membranous, 3-nerved; upper convex, almost as long as the spikelet and of the same outline, membranous, 5-nerved, nerves distinct, somewhat prominent upwards and anastomosing there. Lower floret 3: valve corresponding in length and shape to the spikelet, slightly depressed upwards, very similar to the upper glume in substance and venation; valvule as long as the valve, keels marginate; anthers $\frac{5}{8}$ lin. long. Upper floret elliptic in outline, acute, almost as long as the lower: valve and valvule crustaceous, very delicately rugulose, shining, the former faintly 5-nerved.—Panicum desertorum, A. Rich. Tent. Fl. Abyss. ii. 365; Steud. Syn. Pl. Glum. i. 46; Schweinf. Beitr. Fl. Aethiop. 300; Durand & Schinz, Consp. Fl. Afr. v. 746. P. arabicum, Nees ex Steud. l.c. 63. P. geminatum, Schweinf. in Bull. Herb. Boiss. ii. App. ii. 19 (partly); Stapf in Kew Bulletin, 1907, 213.

Nile Land. Nubia: Walled el Assal, Schweinfurth, 495! Wadi Mareg, Schweinfurth, 711! Wadi Yumga, Schweinfurth, 705! Cordofan: without

precise locality, Kotschy, 14! Eritrea: Shobo, Quartin Dillon & Petit! Somaliland: at upper and lower Sheikh and at Burao, Appleton!

Also in tropical Arabia (Fischer, 191! Schimper, 807! Schweinfurth, 893! Bent, 26!).

67. UROCHLOA, Beauv. Agrost. 52, t. xi. fig. 1,

Spikelets broad-ovate to elliptic- or lanceolate-oblong, awnless, usually more or less flattened or slightly depressed abaxially, convex on the back, falling entire from the pedicels, solitary or 2-nate or in fascicles of 3-4, secund and abaxial on the more or less triquetrous rarely strap-shaped rhachis of moderately slender or somewhat stout spiciform racemes; lower floret of or barren with a welldeveloped valvule; upper floret \(\). Glumes similar and subequal or more often dissimilar and very unequal in length, the lower being the shorter, upper resembling and more or less equalling the valve of the lower floret, 5-11- (mostly 7-) nerved, with the nerves evenly distributed. Lower floret: valve 5-7-, rarely more-nerved, the inner lateral nerves somewhat distant from the midnerve; valvule subequal to the valve with well-developed inflexed flaps and sharp sometimes marginate keels. Upper floret: valve elliptic to rotundate-elliptic in outline, very obtuse with a usually scabrid or barbellate mucro, crustaceous with firm margins, narrowly involute, faintly 5-7-nerved; valvule almost as long as the valve, 2-keeled, its sides tightly embraced by the valve all along, of the same texture as the latter. Lodicules 2, small, broadly cuneate. Stamens 3. Styles distinct; stigmas plumose, laterally exserted upwards. Grain tightly enclosed by the more or less hardened valve and valvule, broadly to rotundate-elliptic, dorsally compressed, more or less flattened on both faces with broadly rounded sides; hilum subbasal, punctiform; embryo half to over three-quarters the length of the grain.—Perennial or annual; blades linear to lanceolate, flat; ligules reduced to a ciliate rim; racemes sessile or subsessile on a common axis, simple or nearly so; rhachis more or less triquetrous with a low almost straight or zigzag facial angle or keel, rarely strapshaped; pedicels solitary or in pairs, alternately to the right and the left of the facial angle, usually reduced to short disc-tipped stumps, or if 2-nate the primary slightly longer; spikelets close, contiguous or slightly discontiguous, 2- or irregularly pluri-seriate, glabrous or hairy.—Panicum, & Brachiaria, Benth. & Hook. f. Gen. Pl. iii. 1102 (partly).

Species about 18, in the hot parts of the Old World, one also in America (introduced?).

Very similar to *Brachiaria*, but with the orientation of the spikelets inverted and a short fine mucro from the very obtuse apex of the fertile valve. Although very similar in general appearance, none of the species of *Urochloa* can be said to approach closely members of the genus *Brachiaria*. Their affinities are clearly *inter se*, suggesting a distinct line of evolution. The occurrence of

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W. platyrrhaclis Hubb © Belgran Congp - Mundy Gort Hb. Solesbuy 5038 parallel states, one with glabrous, the other with pubescent spikelets, but otherwise indistinguishable, runs almost through the whole genus. To this may be added the presence of a submarginal fringe in the lower floret, almost normal in some and very rare in other species, and apparently in no case correlated with other characters. I have abstained from giving these states varietal names. They may, if it is desirable to designate them briefly, be distinguished as forma spiculis glabris or forma spiculis pubescentibus or fimbriatis.

Spikelets $1\frac{1}{4}-2\frac{1}{2}$ lin. long; lower glume ovate to lanceolate or oblong, $\frac{1}{4}$ the length of the spikelet to as long as the spikelet, nervation always distinct except sometimes in 8 (*U. rudis*).

Racemes normally 2; rhachis strap-shaped, herbaceous, with the margins curving over the bases of the spikelets; spikelets lanceolate-ovate, acutely acuminate, 2 lin. long, often reddish; glumes subequal, with about 7 percurrent and several shorter nerves in the upper part

1. U. bifalcigera.

Racemes normally more than 2, up to ∞ ; rhachis subtriquetrous with a low facial angle to triquetrous,

Lower glume almost as long as the upper, more or less truncate or obtuse, 3- or sub-5-nerved, frequently with 1 or more bristles from a supracentral tubercle; spikelets 2-2\frac{1}{4} lin. long, subulate-

current

acuminate.

Annual; spikelets broad-ovate; lower glume more or less truncate with the lateral nerves, per-

Re:

. 2. U. trichopus.

Perennial; spikelets elliptic-oblong to oblong; lower glume obtuse with the lateral nerves not percurrent and usually inarching and anastomosing with the midnerve below the tip ...

3. U. pullulans.

Lower glume \(\frac{3}{4}\)-\(\frac{1}{4}\) the length of the spikelet and much narrower than it above the clasping base.

Lower glume over \(\frac{1}{2}\) the length of the spikelet, lanceolate, 5-7-nerved.

Spikelets 2½ lin, long; upper glume 5-nerved;

4. U. brachyura.

Spikelets 1½-2 lin. long; upper glume 7-nerved; perennial

... 5. U. bolbodes.

Lower glume less than ½ the length of the spikelet.

Spikelets subulate-acuminate, hispid; lower glume broad-ovate to ovate-lanceolate, acuminate, up to ⅓ the length of the spikelet, 3- or sub-5-nerved; annual

6. U. echinolæn[oides.

Spikelets acutely acuminate to acute: lower glume very shortly acute or subacute from a broad clasping base, $\frac{1}{2-4}$ the length of the spikelet. Spikelets 2 to over $2\frac{1}{2}$ lin. long; lower glume not over $\frac{1}{3}$ the length of the spikelet.

Annual; spikelets ovate to elliptic-oblong in outline, acute, turgid; upper glume 7-11-nerved; leaf-blades linear-lanceolate to lanceolate, about 2-6 in. by 4-6 lin., mostly more or less hairy.

U. gorerine Chiar Karris ika w

Leaves shortly and finely hirsute to almost glabrous; lower glume more or less 5-nerved, upper glabrous or pubescent; lower valve 5-7-nerved

7. U. Helopus.

Leaves densely hirsute to villous; lower glume very short, almost nerveless, upper hispid; lower valve 9-13nerved ...

8. U. rudis.

Perennial; spikelets lanceolate, acuminate; lower glume 3- or sub-5-nerved, upper 7-nerved; leaf-blades lanceolate, $2\frac{1}{2}$ -3 in. by 6-7 lin., glabrous and smooth ...

9. U. setigera.

Spikelets $1\frac{1}{4}$ – $1\frac{1}{2}$ lin. long; lower glume 3–5-nerved, $\frac{1}{3}$ – $\frac{1}{2}$ the length of the spikelet, upper 7-nerved; lower valve 5-nerved; leaf-blades $2\frac{1}{2}$ -9 in. by 4–12 lin. ...

... 10. U. insculpta.

Spikelets up to 1 lin. long; lower glume very small, more or less truncate, often a nerveless whitish scale; leaf-

blades $\frac{1}{2}-2\frac{1}{2}$ in by $2\frac{1}{2}-8$ lin. 11. *U. reptans*.

1. U. bifalcigera stopf. Perennial, from a short oblique rhizome with intravaginal innovations. Culms suberect, compressed and slightly geniculate below, angular, slender, 3-noded, simple, glabrous or slightly pubescent below the nodes, internodes very long. Leafsheaths more or less hairy or the lower villous and bearded at the nodes, the basal narrow, slipping off the culm, 2-4 in. long, the upper tighter, the uppermost up to 6 in. long; ligules reduced to a shortly ciliate rim; blades linear from an equally wide or slightly attenuated base, long-tapering to a fine point, 5-7 in. by 2 lin., flat, flaccid, pale dull green, finely hirsute on both sides, margins delicately cartilaginous and ciliate, midrib and lateral nerves (3-4 on each side) very slender. Inflorescence of 2 sessile frequently falcate secund spike-like racemes, separated by a very slender upwards delicately hairy internode which is usually continued into a short subulate point. Racemes 2-seriate, $2\frac{1}{2}$ - $3\frac{1}{2}$ in. long, simple; rhachis much flattened, thin, herbaceous, with the margins curving over the bases of the spikelets, up to almost 2 lin. wide, glabrous, margins very minutely ciliolate, internodes about \(\frac{1}{2}\) lin. long; pedicels extremely short, glabrous, with discoid tips, alternately to the right and the left, and very close to the delicate midrib. Spikelets laterally contiguous or nearly so, lanceolate-ovate or oblong, acutely subacuminate, 2 lin. long, glabrous or pubescent, straw-coloured or slightly reddish or variegated with dull purple. Glumes equal, as long as the spikelet, or the lower slightly narrower and shorter, quite glabrous or finely pubescent, the lower sometimes with a fine bristle from the centre, membranous, 7-nerved, usually with some additional shorter nerves in the upper part, all the nerves very slender and prominent, particularly upwards, cross-veins very few. Lower floret of, as long as the glumes or almost so: valve lanceolate-ovate, quite glabrous or pubescent like the glumes, but also with a perfect or imperfect fringe of appressed silvery hairs along the

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1 = Bracliaria platynota (K. Schum) Robyns Paucium platynotum K Schum Paucium geobretra Chrov.- file Rob.

for a confidence

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flexure, 5-nerved, the tip slightly thickened; valvule as long as the valve, oblong, acutely acuminate and acutely keeled. Upper floret $\mbox{\ensuremath{\wp}}$, oblong, obtuse, slightly shorter than the spikelet, pale; valve and valvule crustaceous, almost smooth, the former mucronulate and papillose at the tip, the latter with almost equally wide flaps. Anthers almost $1\frac{1}{2}$ lin. long.—Panicum bifalcigerum, Stapf in Journ. Linn. Soc., Bot., xxxvii. 531.

Nile Land. Uganda: Unyoro; roadsides, Dawe, 826! British East Africa: without precise locality, Powell, 15!

This may be Panicum platynotum, K. Schum. in Engl. Pfl. Ost-Afr. C. 101, from Bukoba (Stuhlmann). U. bifalcigera is another instance of the remarkable splitting up of the species into a strain with glabrous and another with pubescent spikelets and the occasional occurrence of lateral fringes in the lower floret.

2. U. trichopus, Stapf. Annual, forming small tufts, 1-3 ft. high.

Culms erect or ascending, moderately stout, glabrous, usually sheathed for the greater part or all along, simple or rarely branched, 4-8-noded. Leaf-sheaths somewhat loose, pale, striate, quite glabrous to loosely and spreadingly hirsute all over with tuberclebased hairs, ciliate along the outer margin, silkily pubescent at the nodes, rarely inconspicuously bearded, with the hairs of the beard short and appressed; ligules reduced to a densely ciliate rim; blades linear-lanceolate to lanceolate from a broad often amplexical base, tapering to an acute point, $2\frac{1}{2}$ -6 in. (rarely longer) by 5-10 lin., flat, soft, frequently yellowish-green, glabrous with ciliate margins or softly hirsute all over with the hairs tubercle-based, midrib slender, slightly prominent below, primary lateral nerves up to 8 on each side, very slender. Inflorescence of 4-9 erect or subcrect often slightly flexuous and somewhat plump sessile or subsessile spiciform secund racemes; common axis slender, 1½-3 in. long, angular, terete below, then semiterete or somewhat channelled or flattened high up, pubescent to subhirsute. Racemes very dense, 2-seriate, simple, from less than 1 to 2½ in. long, solitary, rather evenly distributed or here and there subopposite; rhachis slightly wavy, flat and green on the back, rarely over \(\frac{1}{2}\) lin. wide; midrib zigzag, moderately raised, flanked by the stout subherbaceous scaberulous margins, villous at the base, glabrous upwards; internodes about $\frac{2}{5}$ lin. long; pedicels solitary (rarely with a minute secondary pedicel at its base), reduced to short terete stumps with discoid tips, bearing 1-3 long spreading Spikelets very close, imbricate, broad-ovate, subulatefine hairs. acuminate, 2-21 lin. long, pale green or sometimes tinged with purple. Glumes somewhat dissimilar, membranous; lower oblong with the margins slightly inrolled, truncate, $1\frac{3}{4}$ -2 lin. long, elabrous except for a central tuft of 2-5 rigid tubercle-based hairs from the upper third, 3- (rarely sub-5-) nerved, side-nerves percurrent, transverse veins obscure; upper glume corresponding in size and outline to the spikelet if not narrower, 5-nerved (rarely 7-nerved), finely pubescent. Lower floret 3: valve very similar to the upper glume,

1060

flat or slightly depressed on the back, 5-nerved, the side-nerves approximate to the firmer flexures which usually bear a dense fringe of appressed or ultimately spreading white or purplish cilia up to over I lin. long, or are (rarely) only pubescent; valvule broad-ovate, acuminate, shorter than the valve; anthers \(\frac{3}{4}\) lin. long. Upper floret &, rotundate-elliptic, up to 1½ lin. long, yellowish-green; valve finely rugose towards the margins, otherwise delicately granular; mucro \frac{1}{2} lin. long.—Panicum trichopus, Hochst. in Flora. 1844, 254; K. Schum. in Engl. Pfl. Ost-Afr. C. 101; Lauza & Mattei, Pl. Erythr. in Boll. Ort. Bot. Palermo, ix. 45; Chiov. in Result. Scient. Miss. Stefanini-Paoli, i. 184. P. trichopus, var. lasiostachys, Stapf ex Cheval, Sudania, 34, 146, 159. P. papillosum, Fenzl ex Steud. Syn. Pl. Glum. i. 100. P. trichopodon, A. Rich. Tent. Fl. Abyss. ii. 369; Durand & Schinz, Consp. Fl. Afr. v. 766. Helopus trichopus, Steud. Syn. Pl. Glum. i. 100. Eriochloa trichopus, Benth. in Journ. Linn. Soc., Bot., xix. 39, and in Benth. & Hook. f. Gen. Plant. iii. 1099; Martelli, Florul. Bogos, 91; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 17; Durand & Schinz, Consp. Fl. Afr. v. 739; Chiov. in Ann. Istit. Roma, vi. 165, and vii. 62 (excl. var.).

Upper Guinea. French Sudan: Timbuctu District; Taradji, Chevalier, 2287! 2288!

North Central. Bagirmi: Erguig District; Nigui, Chevalier, 9463! Central

Chari region: Koulfe, Chevalier, 8809 bis!

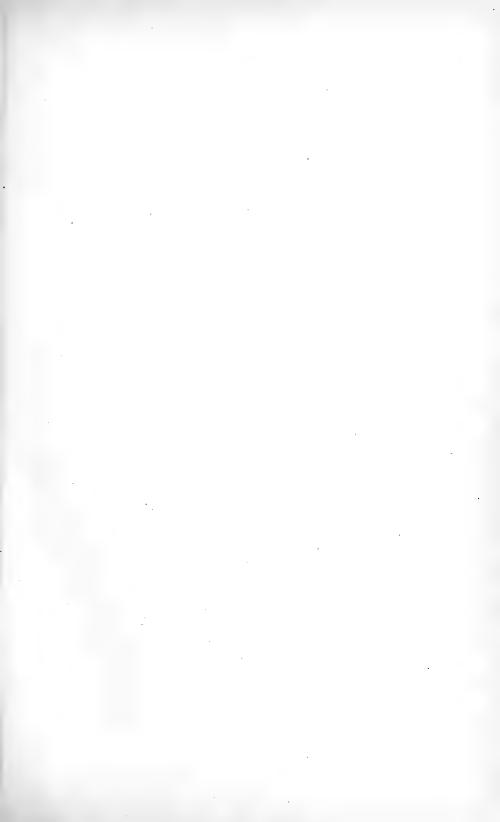
Nile Land. Kordofan: Abu Haraza, Pfund, 116! Katul-Gombara, Pfund, 194! and in fields, without precise locality, Kotschy, 74! Eritrea: Beni Amer; Mount Damba, Pappi, 5983! Abyssinia: Samen, Tacazze Valley, Schimper, 1656! Dehli Dikeno, Schimper, 1161! and without precise locality, Schimper, 365! South Abyssinia: Dereileh, Drake-Brockman, 101! Ogaden, Robecchi-Briccheti. Italian Somaliland: Torda plains, Paoli, 315!

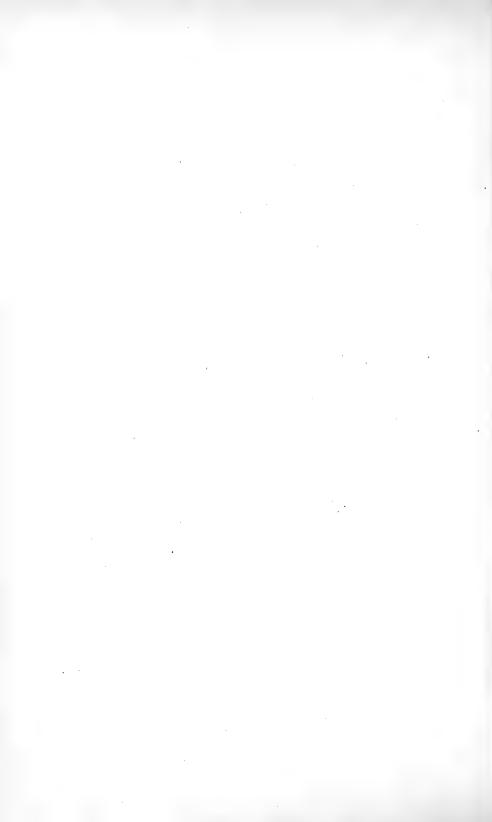
Kotschy's specimens (no. 74) comprise both the fringed and unfringed forms. All the other specimens quoted here have the lower floret conspicuously fringed.

Lauza and Mattei (Pl. Erythr. in Boll. Ort. Bot. Palermo, ix. 46) distinguish a var. Chiovenda of Panicum trichopus. This is stated to be identical with the unnamed variety described by Chiovenda in Ann. Istit. Bot. Roma, vii. 62 (sub Eriochloa trichopus) and to differ in having larger more lanceolate spikelets with a mucronate denticulate-truncate attenuated lower glume almost as long as the spikelet, and a more copious fringe to the lower floret. Chiovenda's plant was collected at Homare (Hamara?) on the Ganale in southeastern Abyssinia, whilst the specimens quoted by Lauza and Mattei were from Eritrea: Beni-Amer; on the upper Shotel River, Senni, 695 (a tall form) and Agordat, Senni, 697 (like the following a small state); Bogos, Keren, Senni, 696. To judge by the characters given by the authors, the var. Chiovendæ seems to come within the ordinary range of fluctuation of U. trichopus as understood here.

A specimen collected by Holst at Muoa, Usambara (no. 3072) is doubtfully referable to this species. It has more slender culms divided into long slender branches upwards, more densely tomentose nodes and a flatter broadly obtuse lower glume without a central bristle, but the spikelets are broad-ovate, longfringed, and very densely packed as in U. trichopus.

3. U. pullulans, Stapf. Perennial from a short premorse rhizome with extravaginal innovations covered in the bud-state with whitishor yellowish-tomentose thin cataphylls, the buds ovoid, plump.





obtuse. Culms ascending from a geniculate and occasionally rooting base, rarely erect, rather stout, up to over 3 (to 7 according to L. Scott) ft. high, glabrous or loosely hirsute below the nodes, simple or sparingly branched below or in tall specimens also higher up with long slender branches, 4- to many-noded, the lowest internodes often compressed. Leaf-sheaths rather tight, pale, striate, more or less loosely hirsute with tubercle-based hairs, or glabrous and smooth except the ciliate outer margins, nearly always densely and spreadingly bearded at the nodes; ligules reduced to a densely long-ciliate rim; blades linear to linear-lanceolate from a broad semiamplexicaul base, long-tapering to a slender point, 6-10 in. by 5-8 lin., flat, more or less flaccid, quite glabrous and smooth except at the rough usually quite eciliate margins, or loosely hirsute, midrib slender, prominent below, primary lateral nerves up to 7 on each side, very slender. Inflorescence of 5-10 (rarely fewer or more) erect or suberect straight or slightly curved or flexuous sessile or subsessile spiciform secund racemes; common axis slender, 2-31 in. long, angular, subterete below, then adaxially hollowed out or flattened upwards, more or less pubescent. Racemes very dense, 2-seriate, simple, 2-3½ in. long, solitary, rather evenly distributed; rhachis wavy, flat and green on the back, $\frac{1}{2}$ lin. wide; midrib rather stout, forming on the face an acute keel, flanked by the herbaceous scabrid margins, villous at the base, glabrous upwards, internodes about 1 lin. long; pedicels solitary or the lowest with a rudimentary usually barren secondary pedicel at the base, reduced to short stout stumps, bearing 1-3 long spreading fine hairs below the thickened tips. Spikelets close, subimbricate, elliptic-ovate to elliptic, subulateacuminate, about 2 lin. long, rarely longer, pale greenish. Glumes somewhat dissimilar, membranous; lower elliptic-oblong, obtuse or subemarginate, 1½ lin. long, flat, quite glabrous like the remainder of the spikelet, except the minutely ciliolate margins, 3-nerved, sidenerves inarching and anastomosing with the midnerve below the apex; upper glume corresponding in size and outline to the spikelet, 5-nerved with few transverse veins above the middle. Lower floret 3: valve very similar to the upper glume, but flattened on the back, 5-nerved, the side-nerves approximate to the firmer flexure; valvule broad-elliptic, acuminate, slightly shorter than the valve: anthers \(\frac{3}{4}\) lin. long. Upper floret \(\frac{\pi}{2}\), broad to rotundate-elliptic, $1\frac{1}{4}$ lin. long, yellowish; valve transversely rugose towards the margins, otherwise like the valvule minutely granular; mucro ½ lin. long. Grain broad-elliptic, dorsally much flattened, greyish.— Panicum geminatum, Schweinf. in Bull. Herb. Boiss. ii. App. ii. 19; partly, not of Forsk..

Nile Land. Eritrea: Dogali, Schweinfurth, 258!

Mozambique Distr. Portuguese East Africa: Msalu River, Allen, 144!
Shupanga, Kirk! near Moramballa, Kirk! between Lupata and Tette, Kirk! and without precise locality, Allen, 1! Nyasaland: Chirimbo, below Elephant

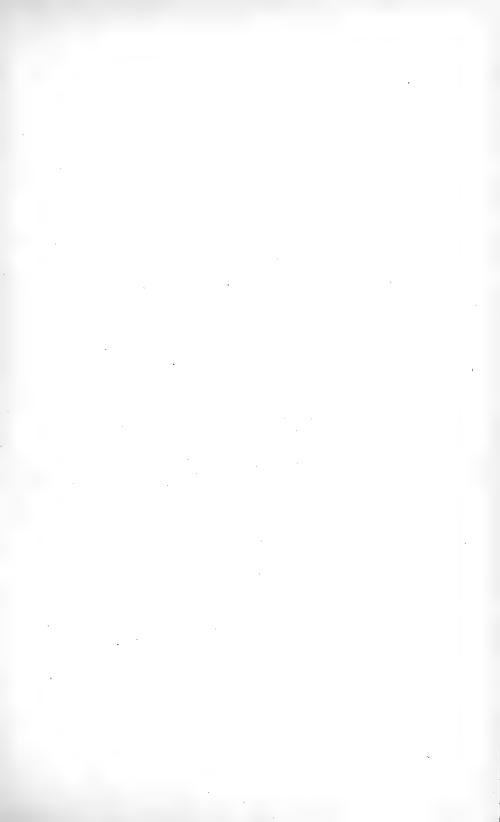
Marsh, on the lower Shire, Scott! between Kongwe and Karonga, 1700–2000 ft., Whyte! Mashonaland: North Mazoe district, Mundy! Southern Rhodesia: Victoria Falls, Rogers, 5719! and without precise locality, Walter, 2216!

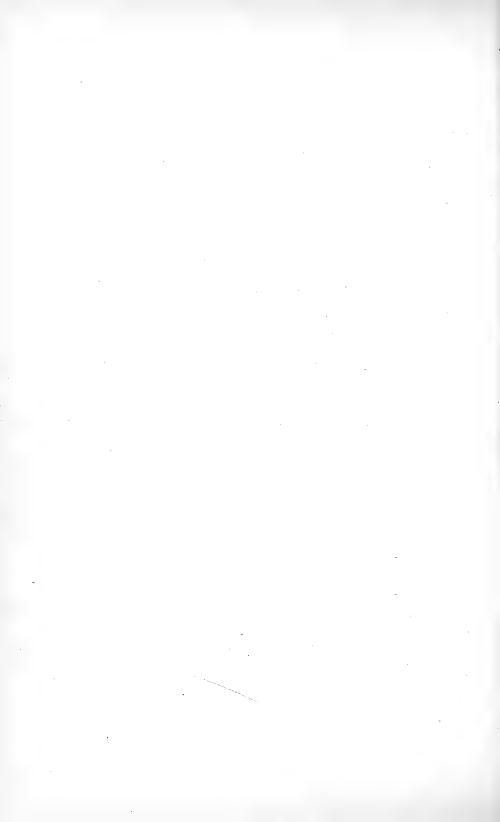
Var. (?) mosambicensis, Stapf. Lower glume with or without a fine stiff hair springing from a small central tubercle. Upper glume more or less pubescent. Valve of lower floret pubescent or shortly (very rarely long) fringed.—Panicum mosambicensis, Hack. in Bolet. Soc. Brot. vi. 140; Durand & Schinz, Consp. Fl. Afr. v. 755; K. Schum. in Engl. Pfl. Ost-Afr. C. 104.

Mozambique Distr. Portuguese East Africa: Mozambique; mainland opposite the Mozambique Island, Carvalho! between Shupanga and Sena, Kirk! Shupanga, Kirk! Mazzaro, Kirk! Nyasaland: Katunga, Scott! Matabeleland: Insiza District, Mundy, 19! Victoria Falls, Allen, 267! Ngamiland: Kwebe, Lugard, 163! and without precise locality, Stigand!

The status of these specimens is somewhat doubtful. Some of them resemble typical examples of \dot{U} . pullulans so closely that they might be considered replicas of them, but for the hairiness of the spikelets; e.g. Scott's Katunga specimen (6-10 ft. high, upper glume and flexures of lower floret densely pubescent) compared with the plant collected by him at Chirimbo, two of Lugard's inflorescences contrasted with the other two from the same collecting (upper glume pubescent, lower floret shortly fringed), Allen's Victoria Falls specimen and Kirk's from Mazzaro and Shupanga on one hand and Allen's no. 1 from Portuguese East Africa on the other (lower floret shortly fringed); Carvalho's and Mundy's from North Mazoe (upper glume and flexures of lower floret very pubescent), etc. The Insiza specimens have longer spikelets with rather long fringes, but they repeat the habit of Mundy's North Mazoe typical samples. It is impossible to decide from dried material whether these modifications are of the nature of unstable fluctuations or represent definite strains (and crosses of these) of indiscriminate distribution. The specimens referred to Panicum trichopus in Dyer's Flora Capensis, vii. 392, represent Hackel's Panicum dorsisetum (name only in Durand & Schinz, Consp. Fl. Afr. v. 748). They differ from typical U. pullulans in having still smaller and mostly narrower spikelets with glabrous or very slightly pubescent upper glumes and shortly fringed or unfringed lower florets. A very fine minutely tubercle-based hair is generally present on the lower glume. (Hack.)

4. U. brachyura, Stapf. Annual, up to over 4 ft. high. Culms scantily tufted, geniculately ascending, sparingly branched, 4- or more-noded, internodes at length shortly exserted upwards, glabrous or the upper more or less pubescent or softly hirsute. Leaf-sheaths somewhat loose, pale, striate, densely ciliate along the outer margin, otherwise glabrous or sparingly hairy, hairs tubercle-based, nodes appressedly and often obscurely silky; ligules reduced to a densely ciliate rim, cilia over 1 lin. long; blades linear from a widened and semi-amplexicaul base, long-tapering to an acute point, 6 to over 12 in. by 3-6 lin., flat or wavy downwards, soft or slightly rigid and stout, pale or yellowish-green, softly hirsute all over and ciliate with tubercle-based hairs or almost glabrous, finely scaberulous, margins narrowly cartilaginous, scabrid, sometimes crisped, midrib very slender, slightly prominent below, primary lateral nerves about 4 on each side, very slender or obscure. Inflorescence of few to 9 erect or suberect straight and stiff or subflexuous sessile or subsessile spiciform subsecund racemes; common axis slender, 1-3 in. long, terete below, then semiterete, more or less flattened upwards, finely and densely pubescent. Racemes dense, 2- or more or less





3- or 4-seriate, simple, up to 3 in. long, solitary and rather evenly distributed or here and there approximate; rhachis triquetrous, pubescent and beset near the margin with tubercle-based spreading hairs, flat and striate on the back, $\frac{1}{4} - \frac{3}{8}$ lin. wide, margins scabrid, internodes $\frac{3}{8} - \frac{1}{2}$ lin. long; pedicels solitary and simple or the lower or all with 1 (rarely 2) secondary pedicel at the base, slender, very short (up to ½ lin. long), pubescent with subdiscoid tips. Spikelets rather close, at first imbricate, then more or less obliquely spreading and laterally contiguous or discontiguous, ovate-lanceolate, acuminate, $2\frac{1}{4}$ $2\frac{1}{2}$ lin. long, pale green or slightly tinged with purple, with a small shortly bearded callus at the base. Glumes rather dissimilar, thinly membranous; lower lanceolate, subobtuse to acute, $1\frac{3}{4}$ —2 lin. long, very finely pubescent, finely 5—7-nerved; upper glume corresponding in size and outline to the spikelet, if not narrower, finely 5-7-nerved, pubescent. Lower floret &: valve very like the upper glume, slightly depressed and finely pubescent between the fringed flexures, 5-7-nerved, fringes silvery, appressed, their cilia almost confined to the lower half of the flexure, but reaching forward to the tips or almost so; valvule oblong, acute, almost as long as the valve; anthers $\frac{3}{4}$ —1 lin. long. Upper floret \heartsuit , elliptic in outline, 1-1½ lin. long, whitish-green; valve delicately granular, rugulose, mucro fine, $\frac{1}{4} - \frac{1}{2}$ lin. long.—Panicum brachyurum, Hack. in Verhandl. Bot. Ver. Prov. Brandenb. xxx. (1888) 142, and in Bull. Herb. Boiss, iv. App. iii. 14; Durand & Schinz, Consp. Fl. Afr. v. 742.

Lower Guinea. South-west Africa: Amboland; Olukonda, Schinz, 638! between Ondonga and Unkuanyama, Rautanen!

Mozambique Distr. Bechuanaland: Mafeking, Sutton's collector, 21!

5. U. bolbodes, Stapf. Perennial, in dense tufts from a short Perennial, in dense tufts from a short premorse usually densely tomentose rhizome, 1 to over 2 ft. high; innovations intravaginal. Culms erect or ascending, slender, about 3-noded, terete or the lowest internode compressed and the following 1 or 2 as long as or shorter than the adjoining sheath, the uppermost (peduncle) long-exserted. Leaf-sheaths tight or at length slipping off the culm, the lower more or less compressed and keeled upwards, more or less spreadingly hairy to densely tomentose, particularly downwards, the uppermost terete and sparingly hirsute, nodes finely pubescent to (the upper) almost glabrous or the lower bearded; ligules reduced to a dense fringe of white cilia; blades linear from an equally wide or slightly attenuated base, long-tapering to an acute or slightly callous point, 6-9 in. by 3-4½ lin., flat, pale green, rather firm, vestiture consisting of a fine greyish pubescence combined with more or less numerous or even dense (particularly downwards) fine spreading hairs or only of the latter and these usually scanty except towards the base, or green and quite glabrous except for the cilia of the finely cartilaginous and scabrid margin, midrib slender, prominent below, whitish above, primary lateral nerves about 5 on

each side, very fine, quite inconspicuous above. Inflorescence terminal, borne on a long slender peduncle, of few to many (up to 20) subcrect or spreading mostly flexuous sessile or subsessile racemes; common axis slender, $\frac{1}{2}$ – $2\frac{1}{2}$ (rarely up to 4) in. long, semittrete below, flatter upwards, pubescent on the adaxial side or all over or sometimes villosulous. Racemes somewhat dense, 2-4-seriate, simple or subcomposite at the base, from $\frac{1}{2}$ to $2\frac{1}{2}$ (rarely to over 3) in. long, evenly distributed or more often approximate upwards, or if numerous here and there crowded into false whorls; rhachis not wavy, subtriquetrous, rather flat, villous or villosulous at the base, glabrous upwards on the green or purplish back, puberulous on the face, angles scabrid and the lateral often with spreading long fine tubercle-based hairs, internodes $\frac{3}{4}$ -1 lin. long; pedicels solitary, reduced to short upwards thickened stumps, or the lowest or all but the uppermost elongated (to over 1 lin.), slender, disc-tipped, bearing 1-3 secondary pedicels with perfect or more or less reduced spikelets and forming thus very short racemules, puberulous or scabrid and often with 1 or 2 spreading long hairs. Spikelets usually crowded, lanceolate-ovate to lanceolate, acutely acuminate or subacuminate, 1½ to almost 2 lin. long, quite glabrous or fringed, pale green or tinged with purple. Glumes somewhat dissimilar, membranous; lower lanceolate from a widened base, acute, three-quarters the length of the spikelet, 5-7-nerved; upper corresponding in size and outline to the spikelet, 7-nerved with a few delicate cross-veins. Lower floret 3: valve very similar to the upper glume, but 5-nerved with the inner side-nerves more distant, flat or slightly depressed, quite glabrous or with an appressed silky fringe along the flexures; valvule lanceolate-oblong, acuminate, as long as the valve, keels finely marginate; anthers \(\frac{3}{4}\) lin. long. Upper floret \(\xi\), elliptic-oblong in outline, very much compressed, slightly over 1 lin. by over ½ lin., yellowish, very delicately wrinkled; valve with a scaberulous mucro, up to \(\frac{1}{4} \) lin. long.—Helopus bolbodes, Steud. Syn. Pl. Glum. i. 100. Panicum oligotrichum, Fig. & De Not. in Mem. Ac. Torin. ii. xiv. 333, t. 10, figs. 1-14. P. bolbodes, Schweinf. Beitr. Fl. Aethiop. 300 (name); Rendle in Cat. Afr. Pl. Welw. ii. 170, and in Journ. Linn. Soc., Bot., xl. 229; Chiov. in Ann. Istit. Bot. Roma, viii. 35, 300 (bulbodes); Eyles in Trans. Roy. Soc. S. Afr. v. 299. P. numidianum, Hackel in Bull. Herb. Boiss. iv. App. iii. 14; not of Lam. Eriochloa bolbodes, Schweinf. in Bull. Herb. Boiss, ii. App. ii. 17; Durand & Schinz, Consp. Fl. Afr. v. 738.

Nile Land. Eritrea: Amasen; Ghinda-Baresa, 3300 ft., Terracciano & Pappi, 127; Ginda; Girsa and Donkollo, 1970–3300 ft., Schweinfurth, 148, 458; Amba; stream near Gheleb, 7200 ft., Schweinfurth, 1480! Abyssinia: without precise locality, Schimper, 2021!

Lower Guinea. Angola: Loanda; dried up ponds near Museque de Linz Gomes, Welwitsch, 7352! 7475! near ponds above Boa Vista, rare, Welwitsch, 7352 b, and without precise locality, Welwitsch, 2906! Gossweiler, 190! Golungo Alto; in sandy mud near Sange, Welwitsch, 7185! in fields and waysides near Camilungo and Ambaca, Welwitsch, 7188! Ambaca; pastures by the River Lucala, Welwitsch, 2741! Pungo Andongo; pastures near





Catete, Welwitsch, 2766! Mutollo, Welwitsch, 2766 b! Huilla; meadows between Lopollo and Monino, Welwitsch, 2673! Humpata, common, 6000 ft., Pearson, 2779! and without precise locality, Newton! Mossamedes; moist sandy places near Bera and Mato dos Capenteiros, Welwitsch, 2598! Damaraland, Een! Hereroland, Lüderitz, 70!

South Central. Belgian Congo: Katanga, Homblé, 4!

Mozambique Distr. Northern Rhodesia; Kafue River flats, Allen, 713! Southern Rhodesia; Melsetter, 4000-6000 ft., Swynnerton, 1699!

Also in Great Namaqualand.

Excellent fodder for cattle according to Welwitsch.

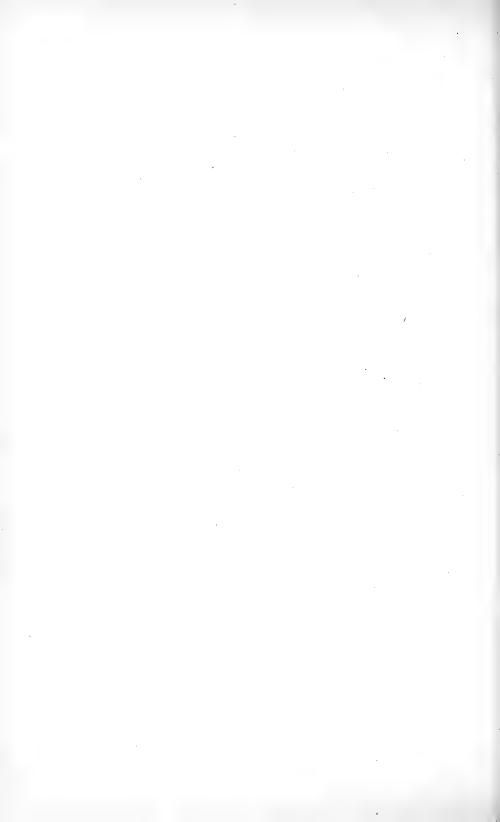
6. U. echinolænoides, Stapf. Annual, in small tufts, up to $1\frac{1}{2}$ ft. high. Culms geniculately ascending or suberect, slender, few-noded (the uppermost internode by far the longest and long-exserted), simple or with a short branch from the lowest node, glabrous or nearly so. Leaf-sheaths somewhat loose, soon slipping off the stem, subherbaceous, striate, densely ciliate, otherwise glabrous or sparingly hairy; ligules reduced to a densely ciliate rim; blades linear from an equally wide base, tapering to an acute point, up to 3 in. by 3 lin., flat, green, loosely hairy, often sparingly so, midrib and lateral primary nerves (3-4 on each side) very slender. Inflorescence longpeduncled, secund, of 2-3 oblique stiff subsessile racemes; common axis \(\frac{1}{2}\)-1 in. long, semiterete or slightly flattened upwards, densely pubescent to tomentellous along the angles, ending with a barren rigid point. Racemes dense, 3-4-seriate, simple, $\frac{3}{4}$ to over $1\frac{1}{2}$ lin. long, solitary; rhachis triquetrous, flat on the back, puberulous on the face, angles scabrid, internodes about 1 lin. long; pedicels 2-nate, one rather slender, $\frac{1}{2}$ lin. long, puberulous with some fine longer yellowish bristles, the other very much shorter to obsolete. Spikelets on the whole crowded, but the superposed distinctly distant, ovatelanceolate, long-acuminate, up to over $2\frac{1}{2}$ lin. long, dull greenish, greyish-pubescent, fulvously setose. Glumes dissimilar; the lower broad-ovate to ovate-lanceolate, acuminate, thin, $\frac{3}{4}$ -1 lin. long, 3- or sub-5-nerved, very minutely pubescent, often with 1-3 tuberclebased bristles; upper corresponding in shape and outline to the spikelet, membranous, 5-7-nerved, finely pubescent with a row of bristles on each side. Lower floret of: valve very similar also as to vestiture to the upper glume, but slightly shorter; valvule oblong, acuminate, minutely truncate, about 7 lin. long, with marginate keels; anthers 1 lin. long. Upper floret $\mbox{$\lozenge$}$, elliptic-oblong, $1\frac{1}{2}$ -2 lin. long, the obtuse tip very minutely puberulous, whitish, delicately granular; mucro 3 lin. long, barbellate.

South Central. Belgian Congo: Katanga; Kundelungu Mountains, under trees, Kässner, 2602!

7. U. Helopus Stapf. Annual, tufted, 1-2 ft. high. Culms erect or geniculately ascending from a short sometimes rooting base, usually rather slender, frequently sparingly branched from the lower nodes, 4-10-noded, intermediate internodes shortly exserted, like the uppermost (peduncle) very sparingly pubescent or

almost glabrous. Leaf-sheaths somewhat loose, pale, striate, densely ciliate upwards, more or less (sometimes very sparingly) shortly hirsute with the hairs tubercle-based, nodes pubescent to subvillous; ligules reduced to a densely ciliate rim; blades lanceolate to linear-lanceolate from a wider and semi-amplexical base. $1\frac{1}{2}$ -6 in. by 4-6 lin., rarely much longer (to 10 in.) and then linear and narrowed towards the base, soft, flat, pale or yellowish-green, loosely and often finely hirsute with tubercle-based hairs, rarely almost glabrous, margins usually crisped or wavy and more or less ciliate, midrib slender, primary lateral nerves about 5 on each side, usually obscure on the upper side. Inflorescence of mostly 4-7 (rarely fewer or more) erect or at length more or less spreading stiff or slightly flexuous sessile or subsessile spiciform secund racemes; common axis $\frac{1}{2}$ -2 (rarely 3) in. long, subsemiterete below, much flattened upwards, pubescent. Racemes moderately dense, seriate, simple, 1-2 in. long, solitary or here and there approximate and then unevenly distributed; rhachis straight or slightly wavy, triquetrous, flat on the back, about $\frac{1}{2}$ lin. wide, villous at the base, glabrous upwards, rarely sparingly hairy, angles scabrid; internodes $\frac{2}{5}$ lin. long; pedicels solitary, reduced to short stout stumps with discoid tips, frequently bearing some long spreading hairs. Spikelets laterally contiguous or subcontiguous, ovate- to elliptic-oblong, very acute, $2-2\frac{1}{2}$ lin. long, greenish, glabrous or pubescent. Glumes dissimilar; lower broad-ovate, subobtuse to acute, clasping at the base, $\frac{3}{4}$ -1 lin. long, glabrous or sparingly and minutely pubescent, about 5-nerved, nerves slightly raised and anastomosing; upper glume corresponding in size and outline to the spikelet, prominently 7-11- (mostly 9-) nerved, glabrous or pubescent. Lower floret of or barren: valve very similar to the upper glume, but flat or slightly depressed, 5-7-nerved with the inner side-nerves distant, glabrous or pubescent, very rarely with a lateral appressed fringe; valvule oblong, acute, slightly shorter than the valve; anthers 1 lin. long. Upper floret \mbeta , rotundate-elliptic, greenish to pale brown, $1\frac{1}{4}-1\frac{1}{2}$ lin. long; valve finely transversely rugose or granular, mucro up to $\frac{1}{2}$ lin. long, sparingly barbellate. Grain rotundate-elliptic in outline, much compressed, about 1 lin. long, yellowish or greenish; scutellum three-quarters the length of the grain.—U. pubescens, Kunth, Rév. Gram. i. 31, and Enum. Pl. i. 74. U. panicoides, Schult. Mant. ii. 595; not of Beauv. Panicum Helopus. Trin. in Spreng. Neue Entdeck. ii. 84; Panic. Gen. 150, and Gram. Ic. et Descr. ii. t. 183; Nees, Agrost. Bras. 117; Steud. Syn. Pl. Glum. i. 57; Duthie, List Grass. N.-W. Ind. 4, and Fodd. Grass. N. Ind. 8; Eyles in Trans. Roy. Soc. S Afr. v. 300. P. Helopus, var. glabrescens, K. Schum. in Engl. Pfl. Ost-Afr. C. 101; Stapf in Dyer, Fl. Cap. vii. 392; Wood, Natal Pl. t. 146; Chiov. in Result. Scient. Miss. Stefanini-Paoli, i. 184. P. hirsutum, Koen. ex Roxb. Fl. Ind. ed. Carey, 303. P. Koeniqii, Spreng. Syst. i. 311. P. hochstetterianum, A. Rich. Tent. Fl. Abyss. ii. 369; Chiov. in Ann.

- Mait 2: 595. Order Months of the Russ 2: 476.



Istit. Bot. Roma, viii. 301. *P. geminatum*, Hochst. ex A. Rich. l.c.; not of Forsk. *P. controversum*, Steud. Syn. Pl. Glum. i. 60; Schweinf. in Bull. Herb. Boiss. ii. ii. 19; Chiov. l.c. 35. *Setaria? hirsuta*, Kunth, Rév. Gram. i. 47, and Enum. Pl. i. 157. *S. pilifera*, Spreng. Syst. iv. Cur. Post. 33.

Nile Land. Nubian Desert, Petherick! Eritrea: Damoeita, Hotha Island, Terracciano, 809. Samhar; Saati, Pappi, 2608; Massaua, Valentino. Beni Amer; Mount Damba, Pappi, 5983; Carajai, Pappi, 6182, 6345; Assaorta; Ham-Hamo, Pappi, 5621; Hoasa-Ta Hareb, Terracciano, 2605; Shiahen, Terracciano, 2606; Ingal Ras Koral, Terracciano, 2607. Amasen; Dongolla, near Ghinda, Pappi, 4275. Ocule Cusai; Loggo Sarda, Deggahen, 8525 ft., Pappi, 1411; Aini Torrent, 5900 ft., Pappi, 1889. Abyssinia: Tigre; in fields near Adoa, Schimper, 61! Italian Somaliland: along the Web Shebeli near Balaad, Paoli, 1343.

Mozambique Distr. Rhodesia: Bulawayo, Rogers, 5902! Appleton, 35!

Salisbury, 4900 ft., Eyles, 638! Mrs. Craster, 11!

Also in South Africa, Mauritius and India.

Panicum Helopus of Bentham's Flora Australiensis, vii. 476, is partly Brachiaria notochthona, Stapf (Panicum notochthonum, Domin; the Darling River plant), and partly Brachiaria ramosa, Stapf (Mueller's specimen from the Lower Victoria River). The plant figured by Duthie as Panicum Helopus in Indig. Fodd. Grass. t. 7, is also B. ramosa. Panicum javanicum, Poir., frequently confused with U. Helopus, is U. panicoides, Beauv., a distinct species for which the combination U. javanica will have to be made. The original P. Helopus represents the state with pubescent spikelets, and was described from specimens collected in Mauritius, where, however, also plants with glabrous spikelets have been collected. The pubescent state is predominant in India, and all the Rhodesian specimens quoted here except Appleton, 35, belong to it. On the other hand Petherick's, Schimper's (no. 61) and Paoli's plants and the South African material of U. Helopus at Kew possess perfectly glabrous spikelets. Specimens with pubescent spikelets and at the same time an appressed silvery fringe to the lower floret were collected by Jacquemont near Poona in India. The presence or absence of a hairy vestiture in the spikelets does not appear to be correlated with any other characters; but it has to be observed that the spikelets of the specimens from the African mainland, particularly those from Rhodesia and South Africa, are on the whole slightly larger and more acute than those from Mauritius and India.

8. U. rudis, Stapf. Annual, in ample erect tufts, over 1 ft. high. Culms rather stout, subterete or angular, sheathed almost all along, branched from most nodes except the uppermost, with the branches erect, about 6-noded, internodes pubescent or hirsute below the nodes. Leaf-sheaths rather tight, pale, finely striate, densely hirsute to villous (including the nodes) with long yellowish hairs; ligules reduced to a densely ciliate rim; blades linear-lanceolate to lanceolate from a broader and semi-amplexicall or scarcely widened base, acute with a callous point, 2–6 (rarely more) in. by 4–6 lin., flat or involute upwards, rather stout, but soft, pale or yellowish-green, villous with short and long hairs, margins finely cartilaginous and crisp, with tubercle-based cilia, midrib very slender, lateral nerves obscure. Inflorescence shortly peduncled or those of the lower branches more or less enclosed in the supporting leaf-sheaths, of few obliquely erect or spreading rigid subsessile racemes; common axis

up to over 1½ in. long, semiterete, upwards flattened, pubescent. Racemes moderately dense, 2-seriate, simple, about 9 lin. long, solitary, evenly distributed; rhachis flat and pale green on the back, triquetrous, ½ lin. wide, pubescent to villous at the base, upwards loosely ciliate on the smooth angles and slightly pubescent on the face, otherwise glabrous, internodes about 1 lin. long; pedicels solitary, reduced to sessile discs bearing some fine bristles below the Spikelets of each rank distinctly discontiguous, ovate to elliptic-oblong, subacute, somewhat turgid, up to 2 lin. long, pale greenish. Glumes very dissimilar; lower very broad, ovate, subobtuse, clasping, up to ½ lin. long, hyaline, nerveless or very indistinctly 1-3-nerved; upper corresponding in size and outline to the spikelet, firmly membranous, up to 11-nerved with the nerves often distinct only towards the tip, more or less covered with short stiff hairs springing from coarse tubercles (hence almost verrucose), smoother towards the base. Lower floret barren (always?): valve similar in size, shape and vestiture to the upper glume, but flattened or subdepressed on the back, 9-nerved (or with 2-4 very fine additional nerves; nerves rather distinct if seen from within) and sometimes smooth on the sides and along the middle nerve; valvule ellipticoblong, subobtuse, as long as the valve with hard cartilaginous keels. Upper floret \(\xi\), broad-elliptic-oblong, almost 1\(\frac{1}{2}\) lin. long, yellowish; valve 7-nerved, very delicately wrinkled, mucro rough, very short. Anthers slightly over \(\frac{1}{2}\) lin. long. Grain rotundate-elliptic, very strongly compressed; scutellum over half the length of the grain; hilum rather large.

Nile Land. Italian Somaliland: Gharabwein near Obbia, Drake-Brockman, 954!

The only anthers seen were found in the spikelets of lateral inflorescences which had not emerged from the supporting sheaths. They were enclosed in the floret together with the half-ripe grain, the spikelets evidently being cleistogamous.

9. U. setigera, Stapf. Perennial, up to over 3 ft. high; innovations extravaginal with thin pubescent cataphylls. Culms ascending sometimes from a long straggling rooting base with elongated more or less compressed arching internodes, sending up erect simple or sparingly branched secondary culms; primary culms (except the prostrate base) or secondary culms 4-5-noded, quite glabrous, lower internodes often somewhat compressed, shortly exserted. Leafsheaths tight, those supporting branches at length slipping off the culms and often wrapped round the former, all very pale, smooth and glabrous except along the densely villously ciliate margins or with few fine tubercle-based hairs, nodes pubescent to silkily bearded; ligules reduced to a densely ciliate rim; blades lanceolate from a rounded or subcordate and semi-amplexicaul base, tapering to an acute point, $2\frac{1}{2}$ -3 in. by 6-7 lin., rarely much larger (up to 6 in. by 11 lin.), flat, slightly rigid, pale green, glabrous and smooth except



10:= U. Lata (Schum) Hubh Pauseum latin Schum. 1827 fine Hubb

the scabrid cartilaginous and often undulate or crisped margins, and some rigid long cilia towards the base, midrib and lateral nerves (5-6 on each side) very slender, the latter rather inconspicuous. Inflorescences terminal, long-exserted on a slender peduncle, of 4-7 obliquely erect or spreading somewhat slender sessile or subsessile spiciform secund racemes; common axis slender, $1\frac{1}{2}$ -3 in. long, semiterete below, flattened upwards, glabrous or here and there with a few very fine hairs, scaberulous along the angles. Racemes moderately dense to almost loose, 2- or indistinctly pluriseriate, simple, solitary, the lower and intermediate to over 2 in. long and about equidistant, the uppermost much shorter and more approximate; rhachis almost straight, rather flat, \frac{1}{5} to over \frac{1}{4} lin. wide, subtriquetrous with the facial angles low, hairy at the base, glabrous or sparingly setose upwards, angles scabrid, internodes $\frac{1}{2}$ to over $\frac{3}{4}$ lin. long; pedicels reduced to subterete stumps or the longer of a pair distinctly elongated and up to over \frac{1}{2} lin. long, usually with some fine white bristles below the discoid tips. Spikelets of each rank discontiguous, ovate-lanceolate, acutely acuminate, 2 lin. long, pale greyish-pubescent or quite glabrous. Glumes very dissimilar, membranous; lower broad-ovate, clasping at the base, acute, $\frac{3}{4}$ lin. long, 3- or sub-5-nerved, tips of nerves more or less anastomosing; upper glume corresponding in size and outline to the spikelet, prominently though finely 7-9-nerved. Lower floret barren: valve very similar to the upper glume, somewhat flat on the back, 5-nerved; valvule broad-oblong, acuminate, somewhat shorter than the valve. Upper floret \(\timeg\), broad- to rotundate-elliptic in outline, about 1 lin. long, pale, very delicately wrinkled or granulate; valve with a scaberulous mucro \(\frac{3}{8}\) lin. long.—Panicum setigerum, Retz. Obs. iv. 15; Roxb. Fl. Ind. i. 302; Kunth, Enum. i. 90; Hook. f. Fl. Brit. Ind. vii. 36 and in Trimen Handb. Fl. Ceyl. iv. 141. P. affine, Poir. Encycl. Suppl. iv. 273.

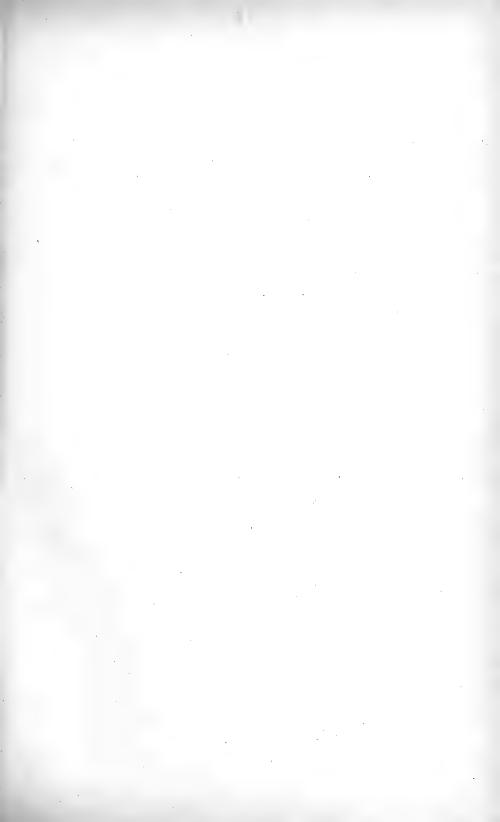
Mozambique Distr. German East Africa: Tanga, Sacleux, 2569! Amboni; by roads, Holst, 2844!

Also in India and Ceylon. Retzius described his Panicum setigerum from a specimen stated to have been collected in China by Bladh; but there is no other record of its occurrence in that country.

The African specimens have glabrous spikelets. In India, however, the

pubescent form appears to be prevalent.

10. U. insculpta Stapf. Annual, up to 4 and even 5 ft. high, but mostly much shorter. Culms solitary or in scanty tufts, erect or more usually geniculately ascending, often rooting from the lowest nodes, simple or more or less branched, 4-7- (rarely more-) noded, terete or angular and sometimes compressed below, glabrous. Leafsheaths somewhat loose, the lowest often slipping off the culm, subherbaceous, striate, finely ciliate along the margins, nearly always greyish-pubescent or subvillous at the nodes, otherwise glabrous or more or less softly hirsute (particularly upwards), with tubercle-based hairs; ligules reduced to a densely ciliate rim; blades lanceolate to lanceolate-linear (rarely almost linear) from a rounded or subcordate subamplexical base, long-tapering to a slender point, $2\frac{1}{2}$ to over 9 in. by 4-12 lin., flat, soft and often flaccid, subglaucous to yellowishgreen, more or less ciliate downwards along the scabrid cartilaginous margins, otherwise glabrous or more or less finely hirsute, midrib slender or in large blades stouter and prominent (beneath) towards the base, primary lateral nerves very slender, 4-5 or in large blades up to 7 on each side. Inflorescence borne on a slender peduncle which on maturity is more or less exserted from the uppermost sheath, of generally numerous obliquely erect sessile or subsessile rarely shortly peduncled spiciform secund racemes, crowded into an oblong or ovate-oblong panicle, 3-7 in. long, in starved specimens occasionally reduced to 5 or 6 or even fewer more scattered racemes; common axis 1½-5 in. long, striate, subterete below, sharply angular upwards, scabrid at the angles, otherwise glabrous to pubescent or almost villous, often with scattered spreading long white hairs. Racemes straight or subflexuous, rather dense or looser upwards, usually very irregularly pluriseriate, more or less compound particularly downwards, with very short secondary racemes, the lower and intermediate 1-3 in. long, the upper rapidly shortening and passing into the racemules of the terminal raceme, in small specimens all simple or almost so and $\frac{1}{2}$ -1 in. long, if numerous crowded here and there in false whorls, but always more approximate upwards; rhachis slightly wavy or straight, triquetrous, $\frac{1}{4}$ to almost $\frac{1}{2}$ lin. wide, pubescent or villosulous at the base, glabrous (or sometimes with a few long spreading hairs) on the flat pale or glaucous-green back, angles very sharp, scabrid, the lateral frequently with scattered long spreading hairs, internodes $\frac{3}{4}$ to over 1 (or the uppermost over 2) lin. long; pedicels fascicled, forming cluster-like racemules of 3 or 4 (rarely more) frequently partly imperfect spikelets or 2-nate or solitary, reduced to short stout obscurely disc-tipped stumps usually with some long white spreading hairs. Spikelets elliptic-oblong, shortly acute or apiculate, $1\frac{1}{4}$ to over $1\frac{1}{2}$ lin. long, pale green, nearly always quite glabrous. Glumes thinly membranous, dissimilar; lower rotundate-ovate, clasping at the base, acute to subacute, 3-5-nerved, with the tips of the lateral nerves anastomosing, $\frac{1}{3}$ the length of the spikelet; upper corresponding in shape and outline to the spikelet, 7-nerved, nerves slender, green, with few delicate crossveins upwards. Lower floret barren, rarely 3: valve very similar to the upper glume, but flat or slightly depressed and 5-nerved; valvule oblong, acute, shorter than the valve, flaps evanescent upwards, keels narrowly winged towards the base. Upper floret ♥, elliptic, up to $1\frac{1}{4}$ lin. by $\frac{3}{4}$ lin., very obtuse to subobtuse, yellowish to pale brown, delicately wrinkled or granular; valve with a minute apiculus or a mucro up to $\frac{1}{4}$ lin. long, like the valvule very firmly crustaceous, the latter with a smooth keel-edge and flaps; anthers



Pan hamadensk Meg - U. lata fide Hubb

over ½ lin. long. Grain rotundate-elliptic, almost flat on both sides, dull greenish; scutellum over half the length of the grain.—Panicum insculptum, Steud. Syn. Pl. Glum. i. 49; Jardin, Aperçu Fl. Gabon, 15; Durand & Schinz, Consp. Fl. Afr. v. 751; Pobéguin, Ess. Fl. Guin. Franc. 214; Cheval. Sudania, 32. P. exasperatum, Nees ex Steud. l.c. 62; Durand & Schinz, l.c. 748. P. amplexifolium, Hochst. in Flora, 1855, 194; Durand & Schinz, l.c. 740; Schweinf. Plant. Util. Eritrea, 53 (sphalm. P. amplexicaule); Cheval. Sudania, 160. P. æmulans, Hochst. l.c. 195. P. leersioides, Schweinf. in Bull. Herb. Boiss. ii. App. ii. 21 (partly, no. 895). P. breviradiatum, Hochst. l.e. 195; Chiov. in Ann. Istit. Bot. Roma, viii. 303. P. bispiculatum, Hochst. ex Chiov. l.c. P. trichopus, var. lasiostachys, Stapf ex Cheval. Sudania, 146 (the Kabas Mara specimens).

Upper Guinea. French Guinea: Kouroussa, *Pobéguin*, 478! French Sudan: Djenne on the Middle Niger, *Chevalier*, 2196! Gold Coast: Christiansborg, Johnson, 1013! 1031! Dahomey: Ajuda, Newton, 2–23! Southern Nigeria: Lagos, Macgregor, 109! Northern Nigeria: Nupe; in shady ravines, Barter, 1369! Katagum District, Dalziel, 252! Sokoto, common in fields, Dalziel, 477!

North Central. Central Chari: Kabas Mara, Chevalier, 8809 bis! Bagirmi:

Bahr Erguig; Nigui, Chevalier, 9464!
Nile Land. Eritrea: Beni Amer; Monte Damba, Pappi, 5970! Caraijai, Note Land. Eritrea: Beni Amer; Monte Damoa, Pappi, 5970! Carajai, Pappi, 6239, 6344! Dembelas; Ferfer, Pappi, 6154. Abyssinia: Gallabat; Matamma, Schweinfurth, 1158! 1174! Tigre; in the fields of the Hamedo plain, Schimper, 1085! and without precise locality, Schimper, 1088! Samen; Tacazze Valley, Schimper, 1655! Goelleb; in shady places on the banks of the Tacazze, Schimper, 186! 2143! Jaja, Schimper, 1213! (in Herb. Brussels, partly), and without precise locality, Schimper in Herb. Buchinger, 1161, 1213! Sudan: Deesa, Brown, 787! Jur: Ghattas' Great Seriba, Schweinfurth, 2302!

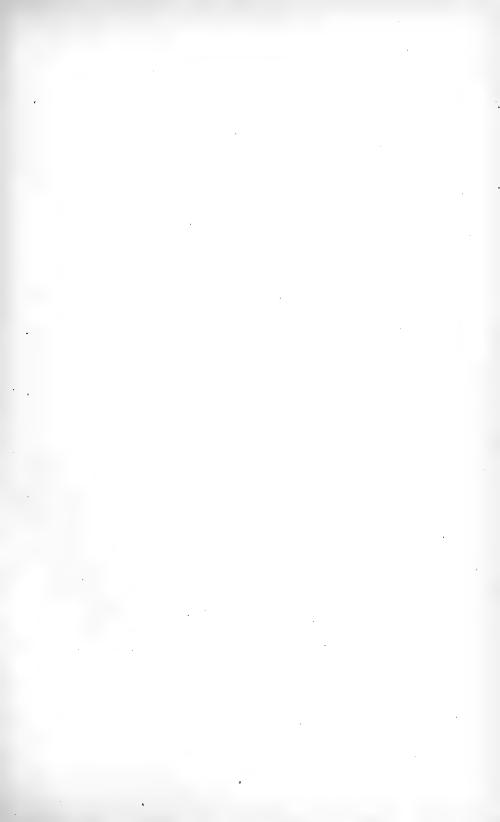
Lower Guinea. Guinea; without precise locality, Jardin!

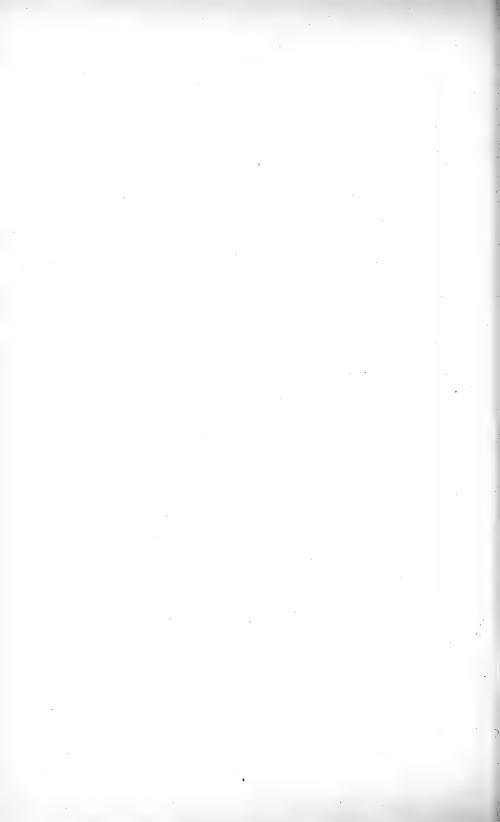
Also in tropical Arabia (Schweinfurth, 895!). Said to be very good fodder (Schweinfurth).

The only specimen with pubescent spikelets I have seen is Dalziel's from Sokoto. It very much resembles pubescent forms of U. Helopus, but may be distinguished from it by the smaller acute or apiculate but not acuminate spikelets with their constantly 7-nerved upper glume.

11. U. reptans, Stapf. Annual or subperennial (?), usually prostrate or creeping, throwing up secondary culms from the rooting nodes of the often long-decumbent base, the lower secondary culms frequently behaving like the primary, or sometimes the culms gathered into more contracted tufts, from \(\frac{1}{2} \) to 1\(\frac{1}{2} \) ft. high, internodes slender to very slender, numerous, those of the decumbent base frequently angular or compressed and bare, of the erect or ascending portions of the culms terete and except the uppermost more or less sheathed, all glabrous. Leaf-sheaths loose or the upper somewhat tight, quite glabrous and smooth except at the densely ciliate margins and frequently pubescent nodes, or occasionally sparingly hairy; ligules reduced to a shortly ciliate rim; blades lanceolate to ovate- or linear-lanceolate, $\frac{1}{2}$ - $\frac{21}{2}$ in. by $\frac{21}{2}$ -8 lin., rounded to subcordate at the base, attenuated from low down to an acute point,

flat or wavy, frequently somewhat rigid, green, quite glabrous or more frequently ciliate downwards, with long stiff hairs or sometimes also pubescent or softly hirsute, margins cartilaginous, scabrid, midrib very slender, lateral nerves numerous, close, very fine, the primary hardly differentiated. Inflorescence at length usually longexserted, ovate to obovate-oblong in outline, from 1 to over 3 in. long, of few to over 12 obliquely erect or spreading slender secund spiciform racemes: common axis slender, semiterete and adaxially channelled below, angular upwards, scaberulous along the angles. Racemes solitary, upwards gradually approximate or irregularly crowded into false whorls, 6-15 lin. long, sessile or subsessile, simple or subcomposite at the base with very short secondary racemes, 2- or irregularly pluriseriate, dense to somewhat loose; rhachis slender, slightly wavy, triquetrous, $\frac{1}{7}$ lin. wide, pubescent or villosulous at the base, scabrid along the angles, internodes $\frac{1}{2}$ -1 lin. long; pedicels paired (or the lower in clusters of 3), unequal, the longer up to $\frac{1}{2}$ lin. long, slender, angular, the other very short to rudimentary, or solitary, usually with some long spreading white hairs and small discoid tips. Spikelets or their pairs or clusters subcontiguous or discontiguous or crowded downwards, elliptic-oblong, acute, up to 1 lin. long, glabrous or greyish-pubescent, greenish, rarely tinged with purple. Glumes very dissimilar; lower reduced to a small rounded or truncate and sometimes apiculate nerveless scale, $\frac{1}{6}$ lin. long, upper corresponding in size and outline to the spikelet, distinctly 7-nerved, glabrous or densely pubescent. Lower floret barren, with or without rudimentary stamens; valve very similar to the upper glume, 5-nerved; valvule oblong, subacute, shorter than the valve. Upper floret \(\), elliptic, pale, finely transversely rugulose, over $\frac{3}{4}$ lin. long; valve with a minute mucro. Anthers \(\frac{3}{5}\) lin. long.—Panicum reptans, Linn. Syst. Nat. ed. x. 870; Hitchcock in Contr. U.S. Nat. Herb. xii. 119 and 225; Hitchc. & Chase in Contrib. U.S. Nat. Herb. xv. 36, fig. 17, excl. P. grossarium. P. repens, N. L. Burm. Fl. Ind. 26, t. 11, f. I (mala); Rottl. in Neue Schrift, iv. 182; Roxb. Fl. Ind. i. 302; Boj. Hort. Maur. 364; not of Linn. P. prostratum, Lam. Ill. i. 171; Delile, Fl. Ægypt. Illustr. 51; Trin. Diss. ii. 150, Pan. Gen. 158, and Sp. Gram. Ic. t. 184, 185; Kunth, Enum. i. 89; Suppl. 68; Steud. Syn. Pl. Glum. i. 62; Miq. Fl. Ind. Bat. iii. 446; Griseb. Fl. Brit. W. Ind. 546; Schweinf. Beitr. Fl. Aethiop. 301, and in Bull. Herb. Boiss. ii. App. ii. 20; Balansa in Bull. Soc. Bot. France, xix. 325; Baker, Fl. Maurit. 435; (?) Benth. Fl. Austral. vii. 476; Duthie, List Grass. N.-W. Ind. 6; Ill. Indig. Fodd. Gr. t. 45; Fodd. Grass. N. Ind. 11; Boiss. Fl. Or. v. 438; Durand & Schinz, Consp. Fl. Afr. v. 760 (excl. some syn.); Aschers. & Schweinf. Ill. Fl. Egypte, 160; K. Schum. in Engl. Pfl. Ost-Afr. C. 102; Cordem. Fl. Reun. 116; Hook. f. Fl. Brit. Ind. vii. 33; Rendle in Journ. Linn. Soc., Bot., xxxvi. 332; Merrill in Philipp. Journ. Sc. i. 355. P. barbatum, Lam. l.c. P. cæspitosum, Sw. Fl.





Ind. Occ. i. 146. P. Sieberi, Link, Hort. Berol. i. 207. P. procumbens, var., Nees, Agrost. Bras. 109. P. crispum, Llanos, Fragm. 42. P. insularum, Steud. Syn. Pl. Glum. i. 61. P. calacczense, Steud. l.c. 65; Vidal, Pl. Phan. Cuming. 157, and Rev. Pl. Vasc. Filip. 287. P. aurelianum, Hale in Wood, Classbook, ed. iii. 787. P. viaticum, Salzm. ex Doell in Mart. Fl. Bras. ii. ii. 155. P. marginatum, Vahl ex Hook. f. Fl. Brit. Ind. vii. 33. Brachiaria prostrata, Griseb. in Abh. Ges. Wiss. Goett. vii. 263.

Mozambique Distr. Zanzibar, Last!

Widely distributed throughout the Indo-Malayan region and tropical and subtropical America; also in tropical Arabia and the Mascarenes. The state with pubescent spikelets is rare and appears to have been collected in India only.

Considered in India to be good fodder for cattle.

Imperfectly known species.

12. Panicum (Brachiaria) rovumense, Pilg. in Engl. Jahrb. xxxiii. 47. Culms decumbent, geniculate, slender, branched from the lower nodes. Leaf-sheaths striate, setose-pubescent (particularly the lower); ligules a fringe of dense white hairs; blades linear-lanceolate narrowed towards the base, long and gradually tapering to an acute point, 4-6 in. by 3-3½ lin. with long white spreading hairs. Inflorescence long-exserted, $2-3\frac{1}{4}$ in. long, of about 6 short spreading secund spiciform racemes; common axis slender, stiff, whitesetulose. Racemes about $2\frac{1}{3}$ in. long; rhachis straight, narrow, white-setulose; pedicels solitary, short. Spikelets constricted into a short globose stipe at the base, 2 lin. long. Glumes dissimilar, loosely hairy, hairs white; lower almost as long as the spikelet, narrow-lanceolate, caudate-acuminate, 3-nerved; upper ovate, caudate-acuminate, as long as the spikelet, 5-nerved. floret 3, almost as long as the upper glume: valve broadly ovate, acute, with the same vestiture as the glumes; valvule broad, 2-Upper floret $\noinde{\triangleright}$, not quite $1\frac{1}{2}$ lin. long; valve and valvule keeled. crustaceous, smooth, the former shortly mucronate.

Mozambique Distr. German East Africa; in damp meadows near Koa-Schamba on the Rovuma, Busse, 1016.

The description of the glumes suggests that this belongs rather to *Urochloa* than *Brachiaria*.

13. Panicum borzianum, Matt. in Bol. Ort. Bot. Palermo, vii. 167. Annual, tufted, 2–3 ft. high. Culms ascending from a rooting decumbent base, many-noded, repeatedly branched, slender, angular, glabrous. Leaf-sheaths loose, striate, glabrous except at the densely ciliate margins and the pubescent or villous nodes; blades lanceolate, long-attenuated to an acute point, $1\frac{1}{4}-1\frac{2}{3}$ in. by $2\frac{1}{2}-3\frac{1}{2}$ lin., rough from appressed hairs, margins cartilaginous, minutely serrulate and sparingly ciliate at the base. Inflorescence of 10 alternate sessile racemes. Racemes 2-seriate; rhachis narrow, striate,

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scabrid; pedicels very short, stout, shortly and densely hairy. Spikelets rather small, up to 20 per raceme, imbricate, lanceolate, acuminate, dull green. Glumes dissimilar; lower rotundate or shortly acute, almost one-third the length of the spikelet, hairy on the back; upper much narrower than the spikelet, acute, prominently nerved, densely hairy. Lower floret \Im : valve with a long white silky dense marginal fringe. Upper floret $\mbox{$\mbox{$\mbox{$\mbox{γ}}$}$; rotundate-elliptic in outline, pale yellowish, chartaceous, transversely rugulose; valve with a setiform mucro.

Mozambique Distr. Italian Somaliland: abundant in the plain of Merca, $Maculoso,\ 10.$

Undoubtedly a species of Urochloa, but I cannot place it owing to the incompleteness of the description.

68. ECHINOCHLOA, Beauv. Agrost. 53, t. 11, fig. 2.

Spikelets ovate to elliptic- or lanceolate-oblong, usually cuspidate or awned, very convex on the back, flat or slightly depressed in front, falling entire from the pedicels, 2-nate or clustered, secund and abaxial on the triquetrous rhachis of racemosely arranged false spikes; lower floret of or barren, upper floret \(\begin{center} \text{Glumes unequal}, \] membranous, the lower much shorter, more or less ovate from a clasping base, 3-5-nerved, often mucronate, the upper corresponding in length and outline to the spikelet (as seen from the back), very concave, 5-7-nerved, acute, cuspidulate or cuspidate, rarely produced into a short awn. Lower floret equalling the upper glume (excluding cusps or awns): valve very similar to the upper glume, but flat or depressed on the back and often with a more pronounced cusp or an awn; valvule equal to the body of the valve, or in barren florets more or less reduced, hyaline, finely 2-keeled. Upper floret: valve ovate to elliptic-oblong, apiculate or obtuse, very convex on the back, subcoriaceous or crustaceous, polished, faintly 5-nerved, margins firm, involute up to near the tip, then flat, not embracing the tip of the valvule; valvule subequal to the valve and similar in substance, with rounded keels and flaps which thin out towards the flat slightly recurved tips. Lodicules 2, cuneate, fleshy. Stamens Styles distinct; stigmas plumose, exserted from near the tips. Grain broad-elliptic, dorsally flat, ventrally convex; hilum punctiform, subbasal. Embryo elliptic-oblong or ovate, exceeding the middle of the grain.—Perennial and often tall, or annual; blades linear from a slightly constricted or equally wide rarely much attenuated base; ligules 0 or represented by a transverse fringe of hairs; panicles of crowded or loosely arranged secund spiciform branches mostly bearing spikelets from the base or near it; spikelets more or less hispid on the nerves of the glumes, and the lower valve, rarely almost smooth.



3/2 E. senegalinis My

Species about 20-25, in the warm regions of both hemispheres.

The segregation of the numerous forms which make up the genus Echinochloa and their reduction to more or less well definable species is still unsatisfactory, mainly owing to their apparently endless variability and the difficulty, if not impossibility, of discriminating between stable and unstable modifications and the effects of hybridisation. Here, as in other cases, observation in the field and experiment will have to decide. For this reason no attempt at describing varieties has been made in this place. To have done so would probably have led to the establishment of many units without any stable basis.

Lower glume and upper valve equally obtuse or acute or cuspidulate; false spikes 3-4-ranked, mostly short, suberect or erect and more or less appressed to the

common axis, rarely spreading.

Spikelets very obtuse, scaberulous towards the tips only, the nerves of the glumes becoming very obscure below them; ligule represented by a line of fine hairs ... 1. E. obtusiflora.

Spikelets acute to cuspidulate or apiculate.

Ligule represented by a fringe of hairs; false spikes usually appressed to the common axis, 4-9 lin. by 3 lin.; glumes very thin, pubescent and woolly-... 2. E. Holubii. ciliate; perennial

Ligule 0; false spikes usually suberect, not appressed to the common axis, 6-12 lin. by 2 lin.; glumes

membranous, minutely rigidly and appressedly pubescent between the nerves, eciliate; annual 3. E. colona. Ereber

Lower glume and upper valve cuspidate or produced into an awn, the latter more so than the former; false spikes suberect or spreading.

Ligule 0, the region of the junction of blade and sheaths discoloured inside, very finely pubescent or glabrous.

Annual.

Spikelets $1\frac{1}{2}$ lin. (excluding the cusp or awn) in generally simple false spikes, cuspidate or more or less awned from the lower floret; a weed ... 4. E. Crus-Galli.

Spikelets 1¼ lin. (excluding the cusp or awn), abruptly caudate-acuminate or rostrate or (from the lower floret) aristulate, very densely

clustered in compound false spikelets leaving a pinnate skeleton of axes after their fall; usually stout stems

Perennial; spikelets $1-1\frac{1}{4}$ lin. long, cuspidate or shortly awned (awn 3-4 lin. long), in simple false spikes; sometimes tall with stout stems

Ligule represented by a distinct fringe of hairs (sometimes more or less reduced or suppressed in the uppermost leaves).

Spikelets acute or shortly cuspidate, always awnless, $1\frac{1}{2}$ —2 lin. long, in usually large dense panicles with numerous straight obliquely erect false spikes; perennial, tall, reed-like 7. E. pyramidalis.

Spikelets acuminate, usually long-awned and if awnless 2-3 lin. long and in more or less distant frequently nodding false spikes.

Spikelets ovate-oblong to lanceolate-oblong in outline, 2-3 lin. long (excluding the cusp or awn);

... 5. E. Crus-Pavonis.

... 6. E. haploclada.

awns, if any, up to 12 lin. long; false spikes more or less nodding, loosely arranged in a secund panicle; perennial or occasionally annual and then slender and meagre ...

... 8. E. stagnina.

Spikelets oblong, $l_{\frac{1}{2}}$ lin. long (excluding the awns); awn of the upper glume 3 lin., of the lower floret up to over 6 lin. long, very fine; false spikes in dense jubate panicles ...

... 9. E. jubata.

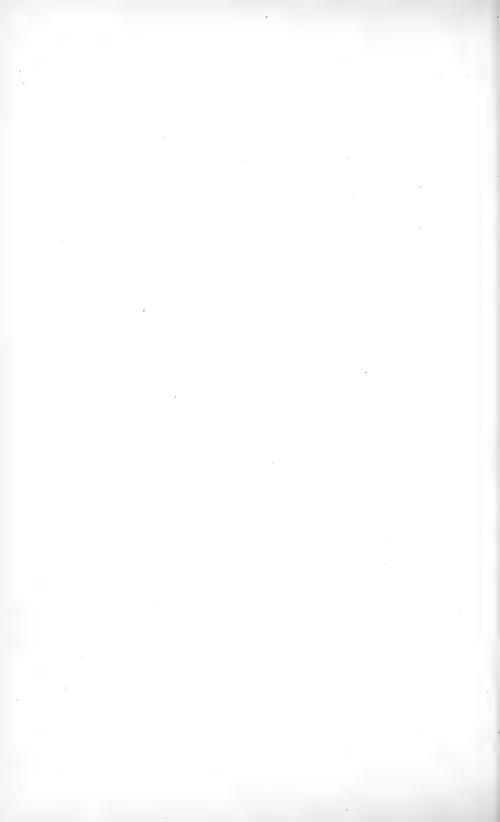
1. **E.** obtusiflora, Stapf. Annual (?), $\frac{1}{2}-1\frac{1}{2}$ ft. high, scantily tufted. Culms geniculately ascending, slender, terete, about 2-noded, branched, glabrous, smooth. Leaf-sheaths terete, tight or at length loosened, finely striate, glabrous, smooth; ligules a fine ciliolate rim; blades narrowly linear from an equally wide base, gently tapering to an acute point, 2-4 in. by $1-1\frac{1}{2}$ lin., flat, somewhat rigid, subcrect, green, glabrous; margins rough, midrib very slender, lateral nerves close but distinct (about 9 on each side of the midrib). Panicle longexserted, erect, very narrow or spiciform, $1\frac{1}{2}$ -5 in. long; axis very slender, triquetrous, almost smooth below, becoming rough along the angles upwards; branches 2-5, solitary, erect and mostly appressed to the axis, distant by less or slightly more than their own length, rarely over 1 in. long, forming dense simple 2-4-ranked subsecund sessile false spikes, 2½ lin. wide; rhachis very slender, flattened, subtriquetrous, $\frac{1}{3}$ lin. wide, scabrid along the angles, with or without some long fine stiff hairs; pedicels 2-nate, very short, scaberulous, tips subdiscoid. Spikelets crowded, elliptic in outline, very obtuse, $1\frac{1}{2}$ lin. long, very pale or brownish on the back, almost glabrous. Glumes membranous, faintly nerved except towards the scaberulous or scabrid tips, nerves not hispid; lower very broadly ovate, obtuse to subacute, less than half the length of the spikelet, 5-nerved, scaberulous upwards; upper glume corresponding to the spikelet in length and outline, very concave, 5-nerved. Lower floret 3: valve very like the upper glume but flat or slightly depressed on the back; valvule elliptic-oblong, obtuse with smooth keels slightly shorter than the valve; anthers 1 lin. long. Upper floret \(\otimes, \) broadly ovate- or elliptic-oblong, with a minute slightly incurved apiculus, as long as the spikelet, whitish, then turning a pale reddish-brown, glossy with a pearly lustre, very finely striate under the lens; valve and valvule subcoriaceous.

Upper Guinea. Cameroons: by the Bogolo river, Miss Macleod, 91! Logone

River, Macleod, 151 a!

2. E. Holubii, Stapf. Perennial, 2-3 ft. high. Culms erect or geniculate from a slender rhizome, terete, glabrous, 4-5-noded, sheathed all along or the upper internodes exserted. Leaves glabrous; sheaths rather loose, terete, striate, bases of the lowest persistent, breaking up into fibres; ligules a fringe of fine hairs; blades linear, scarcely narrowed or constricted at the base, longtapering to a fine point, 4-10 in. by 2-3 lin., subcreet, firm, flexuous,



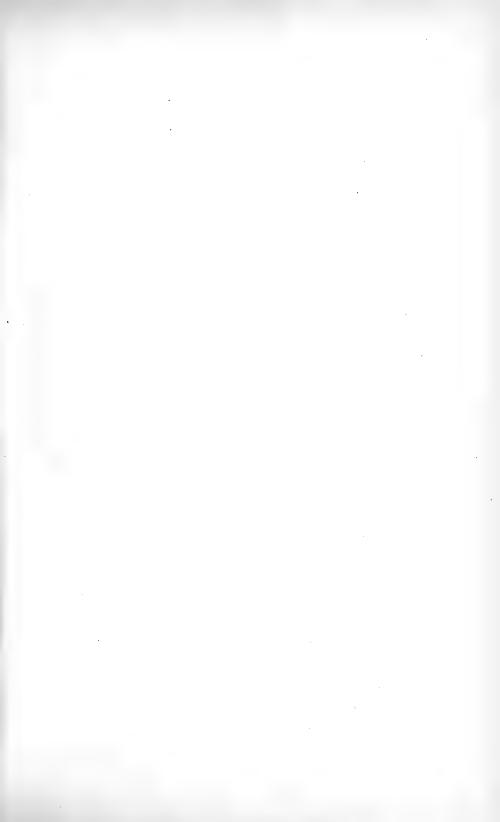


more or less glaucous, smooth except upwards, margins finely cartilaginous, smooth or scabrid, midrib very slender, primary lateral nerves 2 or 3 on each side, very fine or inconspicuously differentiated. Panicles laterally exserted from the uppermost sheath, very narrow, usually interrupted, 4-6 in. long; axis slender, compressed with upwards scabrid angles, glabrous; branches 6-8, erect and appressed to the axis, distant by their own length or more, the lower $\frac{1}{2}$ in. long, the uppermost much shorter, forming subsecund compact 4-ranked sessile false spikes; rhachis slender, slightly wavy, triquetrous, scaberulous, villous at the base; pedicels 2-3-nate, extremely short with discoid tips. Spikelets oblong, subacute or cuspidate, 11-11 lin. long, pale or variegated with purple. Glumes very thin, finely and appressedly pubescent between the nerves; lower broad-ovate, cuspidate, about half the length of the spikelet, 5-nerved, ciliate on the sides; upper oblong, as long as the spikelets, very concave with short slightly compressed tips, 5- or (at the tip) 7-nerved, nerves loosely or minutely hispid, margins very shortly Lower floret 3: valve very like the upper glume; valvule subequal, keels scabrid upwards; anthers $\frac{1}{2} - \frac{2}{3}$ lin. long. Upper floret \(\), as long as the lower, elliptic-oblong, shortly acuminate or cuspidate, light straw-coloured: valve and valvule subcoriaceous, the valve strongly convex on the back; anthers slightly over \(\frac{1}{6} \) lin. long.—Panicum Holubii, Stapf in Dyer, Fl. Cap. vii. 394.

Mozambique Distr Rhodesia: on the Zambesi, Holub! Also in Bechuanaland, the Transvaal and in the Amatola Mountains.

3. E. colona, Link, Hort. Berol. ii. 209. Annual, in small tufts, up to 2 ft. high. Culms rather slender, erect or geniculately ascending, branched mostly in the lower part only, soft and very compressible, glabrous and smooth, internodes more or less exserted. Leaves glabrous, rarely with some minute hairs on the blades; lower sheaths somewhat loose, more or less compressed, thin and (the basal) whitish, upper tighter and subherbaceous, all smooth; ligules 0, junction of blade and sheath glabrous inside; blades linear from an obscurely constricted base, tapering to a slender acute point, 3-12 in. by 2-3 lin., flat, subflaccid, more or less glaucous or dull green, sometimes with black cross-bands, delicately pruinose, margins slightly rough or smooth downwards, midrib very slender, lateral nerves close and usually not differentiated (rarely 3-4 primary nerves distinguishable). Panicles erect, mostly straight, at length more or less exserted, 2-5 in. long, very narrow; axis slender, sulcate and smooth below, upwards becoming more or less triquetrous and rough along the angles; branches usually over 6 to many, solitary, rarely 2-nate, erect and often appressed to the axis or sometimes obliquely spreading, distant by much less than their own length or the lowest sometimes by their own length, rarely more, the lower $1-\frac{1}{2}$ in, long, the following decreasing very gradually,

forming dense simple moderately stout (rarely over 2 lin. wide) subsecund sessile false spikes; rhachis usually slightly wavy, triquetrous, $\frac{1}{5}$ lin. wide, scaberulous or scabrid along the angles. with (particularly at the base) or without some long fine stiff hairs; pedicels 2-nate or fascicled lower down, very short, up to ½ lin. long, scaberulous, tips subdiscoid. Spikelets crowded, usually approximately 4-ranked, ovate to ovate-elliptic in outline, acute or cuspidate, $1\frac{1}{4}$ - $1\frac{1}{2}$ lin. long, greenish or tinged with purple. Lower glume membranous, very broadly ovate and clasping at the base, acute to cuspidulate, ½ lin. long, scaberulous; upper glume subherbaceousmembranous, elliptic-ovate in outline, very concave, acute or cuspidate, as long as the spikelet, 5-7-nerved, rigidly and minutely pubescent between the almost smooth or scaberulous or subspinulose Lower floret of (always?): valve similar to the upper glume, but flat or depressed on the back; valvule oblong, acute, almost as long as the valve or shorter, keels fine, scaberulous upwards; anthers $\frac{2}{3}$ lin. long. Upper floret Σ , elliptic-ovate or subobovate in outline, cuspidulate, from less than 1 to over 1 lin. long, yellowish or whitish, polished; valve and valvule subcoriaceous. Grain broad elliptic in outline, planoconvex, \(\frac{3}{4}\) lin. long. Embryo twothirds the length of the grain.—Parl. Pl. Nov. 40; Nash in Britton, Man. Bot. 78; Hitchcock in Gray, Man. Bot. ed. vii. 118, and in Contrib. U.S. Nat. Herb. xii. 213, xvii. 256, xviii. 345. E. zonalis, Parl. Fl. Panorm. i. 119. Panicum colonum, Linn. Syst. Veg. ed. x. 870, and Sp. Pl. ed. ii. 84; Jacq. Eclog. Gram. t. 32; Roxb. Fl. Ind. ed. Carey, 299; Trin. Gram. Icon. et Descr. t. 160, Pan. Gen. 125, and in Mém. Acad. St. Pétersb. 6^{me} sér. iii. 213; Nees, Agrost. Brasil. 119; Webb & Berth. Hist. Nat. Canar. iii. iii. 383; Schweinf. Beitr. Fl. Aethiop. 300; Steud. Syn. Pl. Glum. i. 46; Fig. & De Not. in Mem. Acad. Torin. 1854, 338, ic. xii.; Benth. Fl. Hongk. 411, and Fl. Austral. vii. 478; Griseb. Fl. Brit. West Ind. 545; Franch. & Savat. Fl. Jap. ii. 160; Baker, Fl. Maurit. 438; Duthie, List Grass. N.-W. India, 3, Indig. Fodd. Grass. t. 4, and Fodd. Grass. N. Ind. 4; Boiss. Fl. Or. v. 435; Aschers. & Schweinf. Ill, Fl. Égypte, 159; Balf. f. Bot. Socotra, 310; Franch. in Journ. de Bot. i. 136, and Contr. Fl. Congo Franç. in Bull. Soc. Hist. Nat. Autun, viii. 347 (reprint 39); Martelli in Nuov. Giorn. Bot. Ital. xx. 368; Hack, in Bolet. Soc. Brot. vi. 140; Penzig in Atti Bot. Congr. Genoa, 1893, 366; Schweinf. Plant. Util. Eritrea, 53, and in Bull. Herb. Boiss. ii. App. ii. 20, 95; Batt. & Trab. Fl. de l'Alg. (Monoc.) 132; K. Schum. in Engl. Pfl. Ost-Afr. B. 78; C. 102; Hook. f. Fl. Brit. Ind. vii. 32; Henriq. in Bolet. Soc. Brot. xiii. 133; Chiov. in Ann. Istit. Bot. Roma, vi. 165, and viii. 31, 299; Rendle in Cat. Afr. Pl. Welw. ii. 173; De Wild. & Durand, Contrib. Fl. Congo, fasc. ii. 72; Eyles in Trans. R. Soc. S. Afr. v. 299; Pobéguin, Ess. Fl. Guin. Franç. 214; Th. & Hél. Durand, Syll. Fl. Congol. 630; A. Cheval. Sudania, 32, 160. P. arabicum, Nees ex Steud. Nomencl.





ed. ii. 252, and Syn. Glum. i. 63 (partly; Schimper, 963). P. brizoides, Linn. Mant. ii. 184. P. tetrastichon, Forsk. Fl. Ægypt.-Arab. 19. P. cuspidatum, Roxb. Fl. Ind. ed. Carey, i. 301; Duthie, Grass. N.-W. Ind. 3; Steud. l.c. 47; Fig. & De Not. in Mem. Acad. Torin, 1854, 340, fig. xiii. P. pseudocolonum, Roth, Nov. Spec. 47; Steud. l.c. 46. P. zonale, Guss. Ind. Sem. H. R. Bocc. 1825, and Fl. Sic. Prodr. i. 82; suppl. i. 20. P. hæmatodes, Presl, Fl. Sic. i. xliii.; Steud. l.c. P. numidianum, Presl, Cyp. & Gram. Sic. 19; not of Lam. P. Daltoni, Parl. ex Webb in Hook. Niger Fl. 185; Steud. l.c. P. equitans, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 365. P. Crus-Galli, Engl. Hochgebirgsfl. Trop. Afr. 119 (partly). P. Crus-Galli, var. colonus, Coss. Glum. Expl. Alger. 28. P. Petiveri, Kotsch. ex Griseb. l.c.; not of Trin.

Upper Guinea. Cape Verd Islands: S. Jago, Hooker, 143! S. Nicolai, in wet places, Bolle! Penafel and Monte Gordo, Cardoso; S. Antao, near Paul, Cardoso; and without precise locality, Cardoso, 241! Senegambia: near rivers, Roger, 62! and without precise locality, Heudelot, 310! 534! French Guinea: Kouroussa, Pobéguin, 481! French Sudan: Koulikoro, Chevalier, 2177! on dry land in Segou, Lécard, 207! 253! Northern Nigeria: Nupe; on high rocks in a small lake, N.E. of Jeba, Barter, 1396!

North Central. Bagirmi; Lower Shari region; Nigui, Chevalier, 9470!
Nile Land. Cordofan: Kat ul Gombara, Pfund, 195! Darfur: Surutj
Distr.; Gebel Barkus, Pfund, 546! Purdy, 92! Nubia: Egedeh, Schweinfurth,
531! Wadi O'Mareg, Schweinfurth, 415! "Aethiopia," Kotschy, 60! 175! in
sandy soil between Old Dongola and Meroe, Bromfield! Khartoum, Broun,
51! Sennar; junction of Dinder and Blue Nile, Broun, 531! Upper Blue Nile, Broun, 1043! junction of Sobat and Nile, Broun, 1599! Eritrea: Dahlak Archipelago; Nocra Island, Terracciano, 2652; Dahlak Island, Terracciano, 460; Dissei Island, Terracciano, 451. Samhar; Massaua, Accadipane; Ras Madur, Schweinfurth, 38. Amasen: lower Lava valley in meadows, Penzig; Metschelt, Terracciano & Pappi, 2352; Ailet, Terracciano & Pappi, 2353; Pappi, 3480; Sabarguma plain, Pappi, 3961, 4086; Amara, 7200 ft., Pappi, 2138, 2264, 2268; Sala Dharo, 7200 ft., Pappi, 2328. Habab; Oghet el Ain, Terracciano & Pappi, 1619. Beni Amer: Mount Damba, Pappi, 5961, 5962; Carajai, Pappi, 6283, 7022! by the Shetel river, Pappi, 6477! Assaorta; Arkiko, Pappi, 2623; by the Aligherri torrent, Pappi, 2370. Upper Barka; Shegolgol-Mantai, 3000 ft., Schweinfurth, 16. Sarae; Gaza Gogo, Pappi, 128. Ocule Cusai; Gheleba plateau, Pappi, 867; Soyra Mountains, 8800–9400 ft., Pappi, 1191; by the Tserena and Belesa torrents, Pappi, 1802! Saganeiti, Pappi, 2050; Mount Metaten, in bush, 8200 ft., Pappi, 3128; Ambatocam, Nile, Broun, 1043! junction of Sobat and Nile, Broun, 1599! Eritrea: Dahlak Pappi, 131; Sy the Iserena and Belesa otheries, Tappi, 1302: Saganett, Pappi, 2050; Mount Metaten, in bush, 8200 ft., Pappi, 3128; Ambatocam, 2000 ft., Pappi, 4072; Damas Valley, Pappi, 4081! by the Mogat Hak torrent, 4000 ft., Pappi, 4169; Scimezana; mountains above Senafe, 7850 ft., Pappi, 807. Abyssinia: wet places near Matamma, Schweinfurth, 1155! Tigre; swamps in the Hamedo plains, Schimper, 1001! Warra river, Schimper, 1480! swamps in the Hamedo plains, Schimper, 1001! Warra river, Schimper, 1480! Sana; in swamps in Walcha plain, Schimper, 1608! Samen; in swamps near Dehli Dikeno, 4000 ft., Schimper, 318; and without precise locality, Schimper, 177! Begemeder, Schimper, 1515! French Somaliland: Obok, Faurot. British Somaliland: Bulhar, Drake-Brockman, 636! 897! 908! Socotra: abundant in the island, Balfour, 563! Uganda: swampy grassland near Bugungu, 4000 ft., Dummer, 3169! Toro; Gerri on the banks of the Nile, Grant! British East Africa: Le, 3700 ft., Delamere! Rabai Hills, near Mombasa, Taylor! Leikipia plateau, by rivers, Gregory!

Lower Guinea. French Congo: Brazzaville, Thollon, 384! Angola: Loanda; in dried-up ponds near Alto das Cruzes, Welstitsch, 7296! 7296 b! Golungo, Alto: on joundated ground near Sange Welstitsch, 7180! 7230!

Golungo Alto; on inundated ground near Sange, Welwitsch, 7180! 7230!

Mossamedes; Giratil, Welwitsch, 2605!

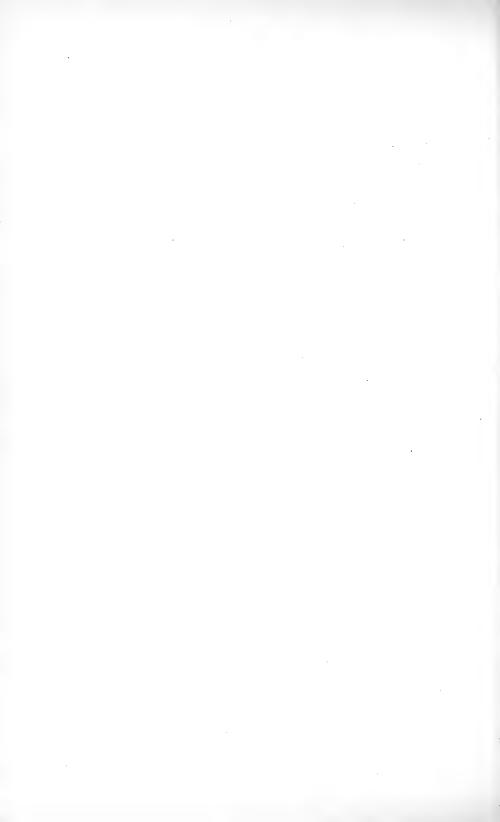
Mozambique Distr. Zanzibar Island, Last! German East Africa: in cultivated land near Tanga, Holst, 2030! Nyasaland: between Kondowe and Karonga, 2000–6000 ft., Whyte, 355! Karonga, Scott! lower Shire valley near Katunga, Scott! and Milauri, Scott! Rhodesia: Victoria Falls, Rogers, 5575!

Widely spread throughout the tropics and the warm-temperate regions of the world, probably of African and Indian origin and often occurring as a weed.

A valuable fodder grass. *P. frumentaceum*, Roxb., extensively grown in India as a grain crop, is evidently descended from it. The spikelets vary from hispidulous to almost glabrous and from acute to cuspidulate or (rarely) distinctly cuspidate, but I do not find the characters correlated with each other or with other characters. A form with dark-barred blades was described as *Panicum zonale* by Gussone, but occurs only rarely in Africa.

4. E. Crus-Galli, P. Beauv. Agrost. 161. Annual: 1-3 ft. high. Culms geniculately ascending, slender to moderately stout, branched below, compressed towards the base, glabrous and smooth, internodes enclosed or exserted. Leaf-sheaths somewhat loose, the lower often compressed, whitish and thin, the upper subherbaceous, all smooth, glabrous and striate except the basal which are pubescent above their insertion; ligules 0, junction of blade and sheath glabrous inside, marked by a brown zone; blades linear from a scarcely narrowed base, tapering to an acute point, 3-10 in. by 3 to over 6 lin., flat, subflaccid, glabrous, more or less dull greyish-green, smooth or scaberulous below, particularly towards the tip; margins finely cartilaginous, scabrid to almost smooth, midrib very slender, lateral nerves close, not differentiated. Panicles erect, strict or flexuous, at length exserted, 3-8 in. long; axis triquetrous, scabrid; branches few to about 15, solitary or 2-nate, subcrect or spreading, distant except the uppermost or all more or less approximate forming a "lobed" panicle, the lower $1-2\frac{1}{2}$ in. long, forming rather stout dense (21-4 lin. diam.) mostly many-ranked simple or subcomposite subsecund sessile false spikes; rhachis triquetrous, scabrid, coarsely bristly, particularly near the nodes; pedicels fascicled or 2-nate, very short, up to ½ lin. long, scabrid, bristly at the base, tips sub-Spikelets crowded, ovate-elliptic in outline, acute, cuspidate or awned, $1\frac{1}{4}$ - $1\frac{1}{2}$ lin. long, greenish or tinged with purple. Lower glume membranous, very broadly ovate, clasping at the base, obtuse to subcuspidate, ½ lin. long, 5-nerved, scaberulous; upper glume herbaceous-membranous, very broadly ovate-oblong, concave, acute, cuspidate, as long as the spikelet, 5- or (near the tip) 7-nerved, rigidly pubescent between the scabrid and spinulose nerves. Lower floret barren: valve similar to the upper glume, but flat or depressed on the back, cuspidate or produced into a scabrid often long flexuous awn, 7-nerved (at least at the tip); valvule elliptic, shorter by a quarter than the valve, keels scaberulous upwards. Upper floret \(\mathbb{\zeta} \); elliptic-ovate in outline, cuspidate, over 1 lin. long, whitish or yellowish, polished: valve and valvule subcoriaceous; anthers oblong, scarcely \(\frac{3}{8}\) lin. long. Grain broad-elliptic in outline, \(\frac{3}{4}\) lin. long.—T. Nees, Gen. Fl. Germ. Monocot. i. t. 21; Reichenb. Ic. Fl. 3'2 E. serregalencis Me Serregal.

aux Roussellon aff colonium, sphelts irrequebarty crowded as in crusquelli muts see types



Germ. i. t. 29, fig. 1411, 1412; Nash in Britton, Man. N. Amer. Fl. 78; Hitche. in Contrib. U.S. Nat. Herb. xii. 213. E. commutata, Schult. Mant. ii. 267. E. hispidula, Nees in Royle, Ill. Bot. Himal. 416; Dalz. & Gibs. Fl. Bombay, Suppl. 98. Panicum Crus-Galli, Linn. Sp. Pl. ed. i. 56; Fl. Dan. t. 1564; Host, Gram. Austr. ii. 15, t. 19; Engl. Bot. t. 876; Knapp, Gram. Brit. xi.; Trin. Sp. Gram. Ic. t. 161, 162; Nees, Fl. Afr. Austr. 58; Steud. Syn. Pl. Glum. i. 47; Benth. Fl. Austral. vii. 479 (partly); Franch. & Savat. Fl. Jap. ii. 160; Duthie, List Grass. N.-W. India, 3 (partly), t. A, fig. 1; Boiss. Fl. Or. v. 435; Hook. f. Fl. Brit. Ind. vii. 30 (partly); Durand & Schinz, Consp. Fl. Afr. v. 744 (excl. var.); Stapf in Dyer, Fl. Cap. vii. 397. P. hispidum, Forst. Prodr. 7; Nees, Agrost. Bras. 257. P. hispidulum, Retz. Obs. v. 18; Lam. Ill. i. 171; Roxb. Fl. Ind. ed. Carey, i. 306; Nees, Fl. Afr. Austr. 57; Royle, l.c. 420; Steud. Syn. Pl. Glum. i. 47; Durand & Schinz, Consp. Fl. Afr. v. 750. P. oryzinum, Gmel. Syst. i. 157; A. Braun, Del. Sem. Hort. Carlsruhe (1846). P. stagninum, Host, Gram. Austr. iii. t. 51; not of Retz. P. Hostii, Marsch. Bieberst. Fl. Tauro-Cauc. iii. 57. P. limosum, Presl ex Nees, Agrost. Bras. 257. Milium Crus-Galli, Moench, Method. 202. Oplismenus Crus-Galli, Dumort. Agrost. Belg. 138; Kunth, Rév. Gram. i. 44, and Enum. i. 143 (excl. syn. P. zonale). O. limosus, Presl, Rel. Haenk. i. 321; Kunth, Enum. i. 144. Orthopogon Crus-Galli, Spreng. Syst. i. 307. O. Retzii, Spreng.

Upper Guinea. Cape Verd Islands: San Jago; Os Organos, in cultivated

ground, Lowe!
Nile Land. Abyssinia: Tigre; without precise locality, Schimper, 1549!

Gondar, Rocher d'Hericourt!

Very common through the greater part of India and Malaya and as a weed throughout the warm temperate countries of the northern hemisphere, rather rare in the tropics of Africa and the New World and south of the tropic of Capricorn. The Cape Verd specimen quoted represents the awned form (Panicum Crus-Galli, var. longisetum, Doell, Fl. Bad. i. 232; Aschers. & Graebn. Syn. Mitteleurop. Fl. ii. 69: Echinochloa Crus-Galli, var. aristata, Reichenb. Ic. Fl. Germ. i. t. xxix. fig. 1412). Of the synonyms quoted above Panicum hispidum, hispidulum, oryzinum, Hostii and limosum and their cosynonyms under Echinochloa, Oplismenus, P. stagninum, Host (not of Retz.) and Orthopogon Patrii in Partii in Pa Retzii represent exclusively this awned form, which in Eastern Asia seems to be predominant.

There are numerous references to Panicum Crus-Galli growing in tropical Africa, but so far as I have been able to check them they cover, with very few exceptions, other species and are quoted accordingly under these species. I add here a list of those specimens which I have not seen but which are enumerated in the literature cited as Panicum Crus-Galli. There is very little doubt that they belong to one or the other species here segregated from E. Crus-Galli.

Zanzibar and Quilimane, Stuhlmann (Klatt in Jahrb, Hamburg, Wiss, Anstalt. ix. (1891) 120).

Bangala, Hens C. 394; Bas Congo, Demeuse, Laurent, 9, 107. Sicia, Dupuis (Durand & Schinz, Études Fl. Congo, 321, 322).

Boma and Bingila, Dupuis (Durand & De Wild. Mat. Fl. Congo, 90).

Mpueto, Descamps; Boma, Laurent; Sicia & Bingila, Dupuis (De Wild. & Durand, Contrib. Fl. Congo I. ii. 72, referred to P. Crus-Galli, var. Petiveri).

Albertville, Descamps (De Wild. & Durand, l.c.).

Piani swamps, Lomba, Dew'evre,~1042 (De Wild. & Durand, Rel. Dewevr. 256).

Lukafu, Verdick, 491 (De Wild. Études Fl. Katanga, 2).

Banana; Temvo, Galiema, Bandundu, M'Fini and Itimbiri, Ém. Laurent (De Wild. Miss. É. Laurent, 200).

Between Kisantu and the Kwango, Butaye, 3713. Lac Foa, Lescrauwaet, 234; Kisantu, Gillet, 3775; Lemfu, Butaye, coll. Gillet, 3474; Dolo and Yokoma, collector not stated (De Wild. Études Fl. Bas et Moyen-Congo, ii. 11).

A troublesome weed in Europe, but often referred to as a valuable fodder grass in other parts of the world (Duthie, Fodd. Grass. N. Ind. 6; Vasey, Agr. Grass. United States, ed. ii. 27; Maiden, Man. Grass. N. S. Wales, 38–41) These references also cover no doubt other closely allied species. At the same time it may be assumed that *E. Crus-Galli*—or at any rate some of its races—share the valuable qualities ascribed to this "*E. Crus-Galli*" of authors. In Egypt *P. Crus-Galli* (vulg. *Dinebha*) is extensively and successfully used for the reclamation of saline land and as a green crop (Yearbook U.S. Dept. Agric. 1902, 580–582).

5. E. Crus-Pavonis, Schult. Mant. ii. 269. Annual, up to 5 ft. high, with copious plump root-fibres. Culms erect, stout, up to over 3 lin. thick and spongy below, glabrous, smooth, 5-8-noded, simple or very sparingly branched, sheathed all along or the internodes at length more or less exserted. Leaf-sheaths terete, striate, smooth, quite glabrous or rarely slightly hirsute towards the junction with the blade, or ciliate upwards; ligules 0, junction of sheath and blade quite glabrous inside or scantily and very minutely pubescent, rarely with a few short stiff hairs; blades lanceolate-linear to linear from a slightly narrowed base, which is often long-decurrent in the upper leaves, tapering to a very fine point, 5 to over 15 in. by 5-10 lin., flat, rather firm, glabrous, more or less rough upwards, otherwise usually smooth, margins cartilaginous, scabrid to spinulose, midrib up to $\frac{3}{4}$ lin. broad, flat above, whitish, lateral primary nerves 4-6 on each side, slightly prominent. Panicle erect, linear-oblong to linear-lanceolate in outline, 4-12 in. long, dense or sometimes depauperate and loose; axis moderately stout and usually flatly triquetrous with a rounded back, or if stouter pluriangular, often smooth at the base, then scaberulous to very scabrid upwards; branches solitary or frequently here and there subopposite, mostly approximate and nearly always (also the lowest) longer to much longer than the internodes, obliquely erect, often very numerous, 4-1 in. long, forming sessile stout mostly very dense downwards compound false spikes, leaving after the fall of the spikelets a neatly pinnate skeleton of axes; rhachis slender, $\frac{1}{4} - \frac{1}{3}$ (rarely $\frac{1}{2}$) lin. wide, triquetrous, scaberulous to scabrid, usually setose at the base and with or without scattered stiff hairs upwards; pedicels fascicled on very short and contracted branchlets to 2-nate, very short, scabrid, tips obscurely discoid. Spikelets in compact clusters, ovate-elliptic





or elliptic-oblong, abruptly caudate-acuminate or rostrate, about 1\frac{1}{4}-1\frac{1}{2} lin. long, light green or tinged with purple. Glumes membranous, rather thin, appressedly minutely and rigidly pubescent between the slender scabrid or spinulose nerves; lower very broadly ovate from a clasping base, acute to subacuminate, one-third to almost half the length of the spikelet, 3-5-nerved, upper corresponding in length and outline to the spikelet, excluding the tips which are shortly mucronate or cuspidate, very concave, 5-nerved. Lower floret barren; valve similar to the upper glume, but flat or depressed on the back with cuspidate or aristate tips, awn slender, scaberulous (in the African specimens rarely over $1\frac{1}{2}$ lin. long); valvule oblong, scaberulous above. Upper floret &, elliptic- or ovate-oblong, subacuminate or cuspidate, up to 14 lin. long, greenish- or greyishwhite, polished: valve and valvule subcoriaceous-crustaceous; anthers \(\frac{1}{4} \) lin. long. Grain obovate-oblong in outline, very broad, ³/₄ lin. long.—Oplismenus Crus-Pavonis, H. B. & K. Nov. Gen. et Sp. i. 108; Kunth, Syn. i. 144; Roem. & Schult. Syst. ii. 486; Mant. ii. 269. Panicum Crus-Pavonis, Nees, Agrost. Bras. 259, and Fl. Afr. Austr. 59; Durand & Schinz, Consp. Fl. Afr. v. 745; Rendle in Cat. Afr. Pl. Welw. ii. 173. P. Crus-Pavonis, var. rostratum, Stapf in Dyer, Fl. Cap. vii. 396.

Upper Guinea. Sierra Leone: on alluvium near Wallia on the Scarcies river, Scott Elliot, 4260! near Kassa, 10° N.L., 3600 ft., Scott Elliot, 5061! and without precise locality, Thomas! French Guinea: Fouta Jallon, between Trévéléya and Timbo, Chevalier, 18323! South Nigeria: Lagos, near water, Dawodu, 225! Oban, Talbot, 850!

Nile Land. Uganda: Ruwenzori; by the Yeria stream, 6000 ft., Scott Elliot,

Lower Guinea. Belgian Congo: Lower Congo, Smith! Stanley Pool Distr.; Kisantu, Gillet! Katanga; Chisangwe, on dry woodless land, Homblé, 23! Angola: Golungo Alto; banks of the Cuango river, Welwitsch, 7201! marshes near Sobato le Bumba, Welwitsch, 7225! 7225b! common on river banks near Sanga, Welwitsch, 2986! Pungo Andongo; in dense marshy thickets on the banks of the Cuanza river near Candumba, Welwitsch, 7430! Benguella; Huilla; on marshy river banks near Humpata, Welwitsch, 7490! country of the Ganguellas and Ambuellas, Gossweiler, 3315! 4072! 4732!

Mozambique Distr. Nyasaland: in marshy ground near the Umbaka river,

Also in Natal and in tropical South America.

(Stapf)
6. E. haploclada, Stapf. Perennial, up to 8 ft. high, in smaller or larger tufts, from a very short and abundantly rooting rhizome with extra- and intra-vaginal innovations, covered with whitish cataphylls, the lowest of them tomentose. Culms erect or geniculate at the base, often more or less compressed below, terete upwards, glabrous, smooth, up to over 4 lin. thick, about 5-noded, sparingly branched, sheathed all along or the upper at length more or less exserted. Leafsheaths rather tight, the lower whitish, more or less compressed and keeled upwards, the upper firmly subherbaceous, terete, all smooth, glabrous and loosely striate; ligules marked by a usually delicately

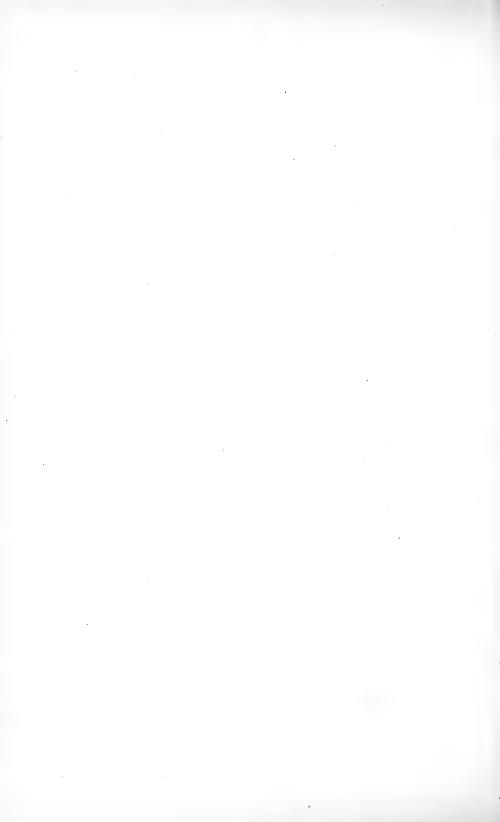
pubescent zone along the junction of blade and sheath, rarely with a few short stiff hairs; blades linear from a slightly rounded and constricted or equally wide base, tapering to a very long and slender point, \frac{1}{2} to over 1 ft. long, 2\frac{1}{2} to over 5 lin. wide, flat, somewhat firm, but flexuous, glabrous, more or less rough upwards and along the margins, otherwise usually smooth, midrib very slender, whitish upwards. Panicle erect, linear to linear-oblong, 4-9 in. by 1-2 in., usually rather dense; axis somewhat slender, angular and more or less grooved below, triquetrous upwards, or triquetrous all along, scabrid along the angles at least upwards and usually with few to numerous stiff hairs or bristles from the nodes; branches numerous, very much longer than the internodes, the lower and intermediate often fascicled or 2-nate, $\frac{2}{3}-1\frac{1}{2}$ in. long, forming subservet or more or less spreading straight or curved or flexuous secund very dense sessile simple false spikes; rhachis slender, triquetrous, from less than $\frac{1}{4}$ to almost $\frac{1}{2}$ lin. wide, scaberulous along the angles, more or less finely pubescent and here and there with a long hair; pedicels mostly 2-nate, almost reduced to the small discoid tips, the pairs less than $\frac{1}{4}$ lin. distant. Spikelets 3-4-ranked, ovate in outline, cuspidate to caudate-acuminate or those of the outer ranks (rarely most or all) awned, $1-1\frac{1}{2}$ lin. long (excluding the awn), pale or tinged with purple or brown. Glumes thinly membranous, finely and upwards somewhat prominently nerved, nerves scabrid to hispidulous; lower broadly ovate from a clasping base, apiculate or mucronulate, 3-5-nerved, minutely rigidly pubescent or almost glabrous between the nerves, ciliolate along the margin; upper glume ovate, cuspidateacuminate, very concave, as long as the spikelet (excluding the awn, if any), 5-nerved, more or less pubescent or scaberulous between the nerves at least upwards. Lower floret 3: valve similar to the upper glume but flat on the back and frequently passing into a fine rigid scabrid awn, 3-4 (rarely 6) lin. long, 5- or upwards 7-nerved; valvule almost as long as the valve, broad-oblong, keels rough upwards; anthers $\frac{2}{3}$ lin. long. Upper floret \heartsuit , ovate to elliptic-ovate in outline, turgid, apiculate, almost as long as the spikelet, greenish or greyishwhite, polished; valve and valvule crustaceous; anthers 1 lin. long. -Panicum haplocladum, Stapf in Kew Bulletin, 1908, 58. Oplismenus Crus-Galli, Speke, Nile Journal, 652; not of Linn.

Nile Land. British East Africa: near Mombasa n temporarily flooded localities, *Hildebrandt*, 1954! 2022! on the coast, without precise locality, *Brand*! Kikumbulio Hills, *Scott Elliot*, 6291! Maji Chumod, *Kässner*, 455! Nairobi (?), *Powell*, 141! Baringa Marsh, *Johnston*!

Mozambique Distr. German East Africa: Tanga, Holst, 2015! Unyamwezi; Turu, in boggy places, Grant! without precise locality, Nobbs, 626! (spec. grown at Salisbury, Rhodesia). Portuguese East Africa; Rovuma river, Meller! in marshland by the Msalu river, Allen, 127! 142! Shupanga, Kirk! between Shupanga and Sena, Kirk! Nyasaland: in marshy ground above the Morumbala Marsh, Scott! Elephant Marsh, Kirk!

Grant's specimen shows black or dark brown cross-bars on the blades, as found in certain forms of E. colona.





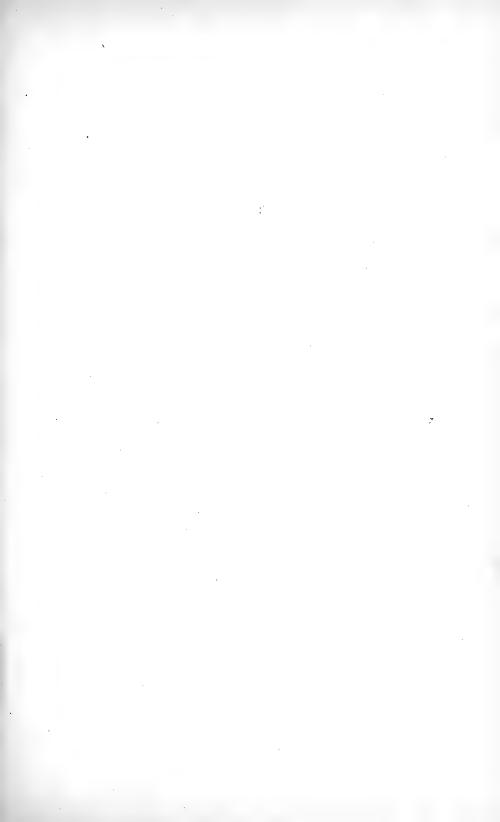
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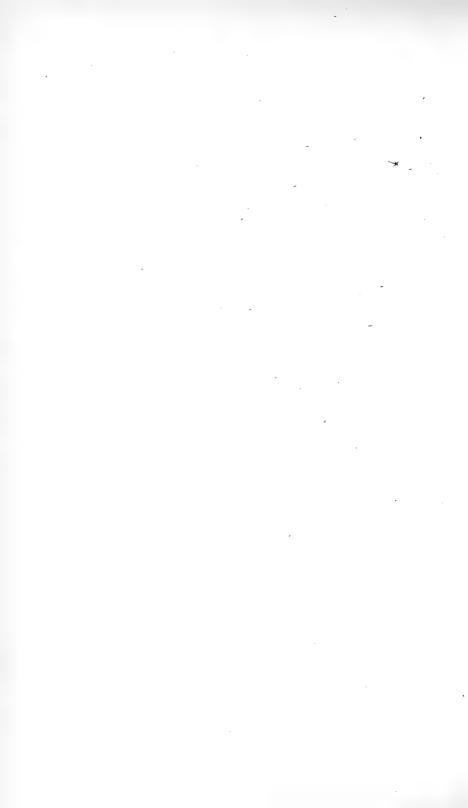
7. E. pyramidalis, Hitchcock & Chase in Contrib. U.S. Nat. Herb. xviii. 345. Perennial, reed-like, up to 15 ft. high, from long and often strong rhizomes with extravaginal innovation-buds covered by pale papery cataphylis. Culms ascending from a geniculate or often long-prostrate or floating and abundantly rooting base, at the base up to over ½ in. thick, many-noded, simple, sheathed all along or the upper internodes at length exserted, quite glabrous and smooth. Leaf-sheaths terete, tight, striate, smooth and glabrous except for the frequently coarsely ciliate or upwards bearded margins, the basal often spongy, tessellated, up to almost 1 ft. lung and very broad; ligule a fringe of mostly long and somewhat stiff hairs, occasionally much reduced or almost suppressed in the uppermost leaves; blades linear from a rather broad and slightly constricted or shortly decurrent base, or attenuated downwards, long-tapering to a fine point, 1-2 ft. by 3-12 lin., flat, very firm, mostly more or less glaucous, sometimes very minutely papillose, scabrid upwards, the margins cartilaginous, scabrid or spinulose or smooth towards the base, midrib whitish and shallowly channelled above, in large leaves up to 2 lin. wide near the base, rounded and less conspicuous on the back, primary lateral nerves slender, if clearly differentiated up to 6 or more on each side, secondary nerves very close. Panicles erect or somewhat nodding, usually linear-oblong and dense, $\frac{1}{2}$ to over 1 ft. long, facing all sides or subsecund; axis stout, 3- to multiangular, sulcate, hispidulous or glabrous and smooth except at the angles which are at least upwards scabrid to spinulose, usually with a fringe or tuft of hairs at the nodes; branches numerous to very numerous, some solitary, others 2-nate or fascicled, the lowest distant, the others rather close, suberect, strict or flexuous, or sometimes nodding, the lower and intermediate 1-3 in. long, forming dense simple or subsimple false spikes, 3-4 lin. in diam.; rhachis slender, 1-1 lin. wide, triquetrous, often with long stiff hairs and besides hispidulous or glabrous, with scabrid angles; pedicels fascicled or clustered, very short with discoid tips. Spikelets ovate in outline, acute to cuspidate, $1\frac{1}{2}$ to over 2 lin. long, somewhat plump, greenish or variegated with purple, sometimes almost blackishpurple. Lower glume membranous, broad-ovate from a clasping base, acute, about half the length of the spikelet, 5-nerved, minutely pubescent, at least towards the margins; upper glume ovate to ovate-oblong, shortly acuminate to cuspidate, very concave, almost as long as the lower floret, 5-7-nerved, minutely and rigidly pubescent or subglabrous between the scabrid or spinulose nerves, or the inner nerves smooth, or almost quite smooth and glabrous. Lower floret 3: valve similar to the upper glume, but somewhat flattened or depressed and more glabrous and smooth on the back and usually more distinctly cuspidate; valvule oblong, subacuminate with scabrid keels; anthers \(\frac{1}{2}\)-1 lin. long. Upper floret \(\frac{1}{2}\), elliptic in outline, minutely apiculate or cuspidate, as long as the lower

(excluding the cusp or awn), straw-coloured, polished; valve and valvule coriaceous-crustaceous.—Panicum pyramidale, Lam. Ill. i. 171, excl. var. β, and Encyc. iv. 745; Kunth, Rév. Gram. i. 223, t. 23, and Enum. i. 93 (excl. var. β); Trin. Panic. Gen. 157, in Mém. Acad. Pétersb. 6^{me} sér. iii. 245; Steud. Syn. Pl. Glum. i. 62; Durand & Schinz, Consp. Fl. Afr. v. 760; Franch. Contrib. Fl. Congo Franç. in Bull. Soc. Hist. Nat. Autun, viii. 347 (39 reprint); Stapf in Dyer, Fl. Cap. vii. 395; Rendle in Cat. Afr. Pl. Welw. ii. 173; A. Cheval. in Act. Congr. Internat. Bot. Paris, 255, in Rev. Colon. vii. (1900), 516, and Sudania, 32; Wood, Natal Pl. t. 472; Chiov. in Ann. Istit. Bot. Roma, viii. 298 (incl. var. quadrifarium); Chiov. in Result. Scient, Miss. Stefanini-Paoli, i. 184, 226 (P. pyramidatum, sphalm.). P. frumentaceum, Benth. in Hook. Niger Fl. 561; not of Roxb. P. plicatum, Benth. l.c. 561 (partly). P. polystachyum, Rich. ex Kunth, Enum. i. 93. P. quadrifarium, Hochst. ex A. Rich, Tent. Fl. Abyss. ii. 367; Walp. Ann. Bot. iii. 716; Steud. l.c. 63; Schweinf. Beitr. Fl. Aethiop. 301. P. atroviolaceum, A. Rich. l.c. 368; Steud. l.c. 63; Schweinf. Beitr. Fl. Aethiop. 300; Durand & Schinz, l.c. 741. P. Crus-Galli, Durand & Schinz, l.c. 744 (partly); Th. & Hél. Durand, Syll. Fl. Congol. 631 (partly?); not of Linn. (see under Echinochloa Crus-Galli). P Crus-Galli, var. sphacelatum, Hack. in Bolet. Soc. Brot. vi. 140 (name)? P. Crus-Galli, var. polystachya, Munro ex Aschers. & Schweinf. Ill. Fl. Égypte, 159; Durand & Schinz, l.c. v. 745, and Études Fl. Congo, i. 322; Th. & Hél. Durand, l.c.

Upper Guinea. Lower Senegal: Mbidgen, Thierry, 14! Kaedi, Chevalier, 2174! and without precise locality, Roger, xxii! Heudelot, 443! Sierra Leone: Port Lokolo, Thomas, 5848! Alluvium near Wallia on the Scarcies river, Scott Elliot, 4260! near Kassa, 10° N. Lat., 3600 ft., Scott Elliot, 5061! French Guinea: common in rivers and marshes in the Baffing Valley, Pobéguin, 1735! Gold Coast: Cape Coast Castle, Vogel, 31! French Sudan: Middle Niger; from Sebi to Lake Debo, Chevalier, 2173! Malina, Chevalier, 2175! 2179, 1781, 1782. Segou; Koundian, in gigantic tufts, Lécard, 125! North Nigeria: Nupe; floating in the river in great masses, Barter, 1156! Katagum Distr., Dalziel, 255! Sokoto, Dalziel, 482! Lake Chad, forming meadows of 3-4 sq. miles, Vogel, 37! South Nigeria: Lagos; marine foreshore, Dalziel,

of 3-4 sq. miles, Vogel, 37! South Nigeria: Lagos; marine foreshore, Dalziel, 1327! Ibu (Obah), Vogel, 49!
North Central. Central Shari: at the confluence of the Salomer river and Bahr el Abrod, Chevalier, 10512!
Nile Land. Eritrea: Maragus; Adi Mabit, 5000 ft., Pappi, 947; Sarae; Adi Ugri, 5950 ft., Pappi, 82; Adi Gana, 5950 ft., Pappi, 273! Abyssinia: Tigre; in swampy meadows near Adoa, Schimper, 206! and without precise locality, Schimper, 998! 1008! 1108! and without precise locality, Schimper, 998! Italian Somaliland: Lower Jub; Elvalda, Scassellati & Mazzocchi, 8; Arrar, Scassellati & Mazzocchi, 14, 15; Nassibunda, Paoli, 403; Margherita, Paoli, 380; Mallable, east of the Jub, 2° N. Lat., Paoli, 764; Merca, Provenzale. British East Africa: Nairobi, Whyte! Miss Johnstone, 53! in the Nairobi river, 3500 ft., Battiscombe, 489! Kisumu, 5400 ft., Dummer, 1935! banks of the Gilgil river, Scott Elliot, 6658! and without precise locality, Powell, 27! Cordofan: Birket-Rahad, Pfund, 543! White Nile, 7° 25' N. Lat., and 8° 30' N. Lat., Petherick! Muriel, 1/99! Tonga, Broun, 1470! Mongalli, Broun, 966! Bor Mission, Broun, 957! Bongoland: Culango, Schweinfurth, 2216!





Niamniam country; Nabambisso, Schweinfurth, 3730! Uganda: Unyoro; in marshes, Grant, 580! Entebbe, Fyffe, 30! Rosoga, 3900 ft., Broun, 257! swamps near Kirgemma, Dummer, 778! Namanyongi, 4000 ft., Dummer, 178! Namanyongi, 4000

swamps near Kirgemma, Dunmer, 778! Namanyongi, 4000 tt., Dunmer, 2571! in a small stream between Dondale and Elmenteita, Scott Elliot, 6844!

Lower Guinea. Belgian Congo: Lower Congo, Smith! Boma Distr.; Boma, banks of the Congo, Hens, A.—202! Stanley Pool Distr.; Kisantu, Gillet, 370! 1104! between Leopoldville and Mombaxi, Gillet, 2618! Makayobo, Vanderyst, 3772! Muschie, Vanderyst, 3916! Bokola, Vanderyst, 4791! Angola: Barrado Bengo; on the banks of the Bengo river, Welwitsch, 2902! Quifandongo on the Bengo river, Welwitsch, 7449! Loanda?, Welwitsch, 7351 b! Pungo Andongo; damp places near Sansamanda, Welwitsch, 2797!

Cordo, Welwitsch, 2747!

Mozambique Distr. Nyasaland: common in Northern Nyasaland, Scott Elliot, 8275! Nyika plateau, Mwanemba Hill, 7000 ft., McClounie, 11! between Kondowe and Karonga, 2000–6000 ft., Whyte, 355! Namasi, Cameron, 22! Shire Highlands, Buchanan, 6! Elephant Marsh, Kirk! floating by the sides of the Shire river, and often forming large islands which pass down the stream, Kirk! above Morambala Marsh, Scott! Portuguese East Africa: Shupanga, Kirk! Rhodesia: Salisbury Distr., Mundy! Makbusi Valley, Eyles, 621! North Rhodesia: near Mumbwa, 15° S. Lat., 28° E. Long., Mrs. Macaulay, 46! Mashonaland; North Mazoe distr., Mundy!

The Abyssinian specimens described as Panicum quadrifarium and P. atroviolaceum appear rather different at first sight on account of the unusually rich colouring of the panicle and the relative or absolute smoothness of the spikelets; but they can be matched with specimens from almost any section of the area of typical E. pyramidalis. They may represent definite races, but

if so they are not yet clearly segregable.

E. pyramidalis, together with E. stagnina, are the chief constituents of the great water meadows of the inundation region of the Niger and of Lake Chad, and also enter largely into the "sudd" of the Nile and other African rivers. According to Chevalier the grains are used as food in Bornu (vulg. Kreb or Kasha) and in Senegambia and the French Sudan (vulg. Lingui). Barter states that in Nupe "an impure salt or carbonate of soda is made by burning this grass, used for culinary purposes when salt is not to be procured," and Lécard describes it as an excellent fodder grass, much relished by animals.

8. E. stagning, P. Beauv. Agrost. 161. Perennial (occasionally annual or at least flowering the first year), rising to 6 ft. from long creeping and copiously rooting rhizomes. Culms geniculately ascending, rooting and frequently branching from the submerged nodes, slender or more usually stout, up to over 4 lin. in diam., manynoded, simple upwards, sheathed all along or some of the internodes at length exserted, smooth and glabrous. Leaf-sheaths terete or subcarinate upwards, smooth and glabrous, rarely pubescent or silkily hairy at the lower nodes, usually more or less ciliate or bearded close to the mouth, the basal often spongy and up to over 6 in. long; ligule a fringe of rather long stiff hairs or 0 in the uppermost leaves; blades linear from a scarcely or long but slightly attenuated and hardly constricted or decurrent base, long-tapering to a fine point, $\frac{1}{2}$ to more than $1\frac{1}{2}$ ft. by $2\frac{1}{2}$ —10 lin., flat, rigid, or (in weak or annual specimens) flaccid, glabrous, deep green (Chevalier), very rough upwards, margins scabrid to spinulose, or more or less glaucous, midrib whitish and striate and flat above, in large leaves rarely over 1 lin. wide near the base, rounded and much less conspicuous on the back, primary lateral nerves 3-5 on each side, like the very close

secondary ones prominent. Panicles more or less nodding and secund. 4-10 in. long, axis slender, triquetrous, with a flat or convex smooth or scabrid back, $\frac{1}{2}$ - $1\frac{1}{4}$ lin. wide, hispidulous or glabrous except at the scabrid angles; branches few to many, distant or rather crowded, alternate, subcrect or nodding, 1-2 in. or occasionally up to 6 in. long, often forming stout dense 2-4-ranked simple secund false spikes; rhachis like the axis but more slender, villosulous or pubescent close to the base, sometimes with scattered long stiff hairs. rarely hirsute all along, ½ lin. wide; pedicels mostly 2-nate, very short, rarely the longer up to almost 1 lin. long, tips discoid. lets crowded, rarely discontiguous, ovate-oblong to lanceolate-ovate, 2-3 lin. long (excluding the awn if any), seldom less, mostly pale green, rarely tinged with purple or red or almost quite purplish-red. Glumes thin, minutely rigidly and appressedly pubescent between the hispidulous nerves, the rigid cilia of the nerves often tuberclebased; lower ovate to ovate-lanceolate, acute or acuminate, more or less mucronate, half to two-thirds the length of the spikelet, 3- to sub-5-nerved; upper glume corresponding in outline to the spikelet, concave, caudate-acuminate or produced into a short scabrid compressed awn, 5-nerved or 7-nerved at the tips. Lower floret 3 or sometimes barren; valve similar to the upper glume, but flat or depressed on the back, subhyaline except at the herbaceous-membranous sides, produced into an awn 2-12 lin. long, scabrid; valvule oblong with more or less scaberulous or, when reduced, smooth nerves; anthers (if any) 1 lin. long. Upper floret \(\), oblong to lanceolate-oblong, mucronate-acuminate, $1\frac{1}{2}-2\frac{1}{2}$ lin. long, straw-coloured, polished; valve and valvule subcoriaceous, crustaceous. Grain obovate-oblong, 1½ lin. by ½ lin., white.—E. scabra, Roem. & Schult. Syst. ii. 479. Panicum stagninum, Retz. Obs. v. 17; Koenig in Verh. Naturf. Freunde, xxiii. 201; Roxb. Fl. Ind. i. 295; Nees, Agrost. Bras. 261; Trin. Pan. Gen. 128, and in Mém. Acad. Pétersb. 6^{me} sér. iii. 216; Steud. Syn. Pl. Glum. i. 47; Stapf in Dyer, Fl. Cap. vii. 394; Wood, Natal Pl. t. 492; Rhod. Agric. Journ. 1906, 500; Cooke, Fl. Bombay, ii. 930: Chiov, in Ann. Istit. Bot. Roma, viii. 299; Chevalier, Sudania, 172; Eyles in Trans. Roy. Soc. S. Afr. v. 301. P. scabrum, Lam. Ill. i. 171, and Encycl. iv. 744; Nees, l.c.; Steud. l.c.; Durand & Schinz, Consp. Fl. Afr. v. 764; De Wild. & Durand, Contr. Fl. Congo, i. ii. 73; A. Cheval. in Compt.-Rend. Assoc. Franc. Avanc. Science, 1900, 650-652, (incl. subsp. oryzetorum, stagninum, Lelievrei and Burgu). P. Galli, Thunb. Prodr. 18, and Fl. Cap. ed. i. 389, ed. Schult. 103. P. Crus-Galli, var. stagninum, Fenzl in Ind. Sem. Hort. Berol. 1850; Hack. in Durand & Schinz, l.c. 745; Hook. f. in Trim. Handb. Fl. Ceyl. v. 136. P. Crus-Galli, vars maximum, submuticum and leiostachyum, Franch. Contr. Fl. Congo Franc. in Bull. Soc. Hist. Nat. Autun, viii. 347 (reprint, 39, 40). P. Crus-Galli, var. submuticum, Th. & Hél. Durand, Syll. Fl. Congol. 631. P. pictum, Nees, Fl. Afr. Austr. 59; not Agrost.





Bras. (nor Koen.?). P. Burgu, A. Cheval. in Compt.-Rend. Assoc. Franç. Avanc. Science, 1900, 642-650, t. v., and in Rev. Cult. Colon. vii. 513-520, and in Act. Congr. Internat. Paris, 1900, 255, t. x. P. Lelievrei, A. Cheval. in Rev. Cult. Colon. vii. 516. P. oryzetorum, A. Cheval. l.c. Orthopogon stagninus, Spreng. Syst. i. 307. Oplismenus stagninus, Kunth, Rév. Gram. i. 44, and Enum. i. 144 (partly). O. scaber, Kunth, Rév. Gram. i. 44, and Enum. i. 145.

Senegambia: Galam, near Bakel (?) in rice fields, Heudelot, Upper Guinea. Kaedi, Chevalier, 2168; and without precise locality, Roger, xxviii! xxiii! Richard! Dupuis! Perrottet, 981! Lelièvre! abundant throughout the inundation belt of the Niger from Segu to beyond Timbuktu, Chevalier; Segu, Lécard, 164! 244! between Sebi and Debo, Chevalier, 2170! Sompi, Chevalier, 2172! Northern Nigeria: Nupe; in swamps and lakes, Barter, 843! Sokoto and westwards to the Niger, blocking streams and waterways, Dalziel, 479! Katagum Distr., Dalziel, 250! Lake Chad; between Madou and Berirem, Chevalier, 10101 bis!
North Central. South Bagirmi: between Bahr Erguig and Nigui, Chevalier,

Nile Land. Jur: Ghattas Great Seriba, Schweinfurth, 1362! 2291! 2298! Bahr-el-Ghazal: Mesheza, Schweinfurth, 1252! Bahr-el-Gebel: Shambe, Broun, 989! White Nile, 8° 30' N. Lat., Petherick! mouth of Sobat river, Schweinfurth, 1118! Blue Nile: near Sherif, Broun, 39! Eritrea: Shimezana, Guna Guna, 7200 ft., Pappi, 631! Maragus; Adi Mabit, Pappi, 946! Abyssinia: Tigre; by and in streams near Amogai, Schimper, 1097! Begemeder; in swamps near Ifak, 5800 ft., Schimper, 1553! in dried up swamps by the bridge over the Reb river between Ifak and Amora Gettel, 5800 ft., Schimper, 1562! in swamps by Lake Tsana, 5700 ft., Schimper, 1402! British East Africa: Nairobi, Linton,

Lower Guinea. French Congo: between Makemo and Mongo, Brazza, 222! Brazzaville, Thollon, 388! Upper Oubangui, Viancin! Belgian Congo: Lower Congo, Smith! Stanley Pool Distr.; Kwamouth, Hens, C. 176! between Leopoldville and Mombaxi, Gillet, 2611! Angola: Benguella; Cunene marshes,

Pearson, 2035! 2037!

Mozambique Distr. Usambara: Muschena, in water, Holst, 3519! Rhodesia: Bulawayo and Matoppo Hills, Appleton, 11! Victoria Falls, Rogers, 13136! Portuguese East Africa: floating in the Kongowe Canal in the Zambesi Delta, Kirk!

This grass deserves every attention on account of its locally abundant supply and high sugar-content. Chevalier in his articles (see above) on "Burgu," the name by which it is known on the middle Niger, states that it is the most useful of all the plants growing in a wild state in the neighbourhood of Timbuctu. Every part of it is utilised. It yields excellent fodder, material for thatching and caulking, is burned to produce a salt used in the manufacture of soap and indigo, the grains are eaten like those of E. pyramidalis and Digitaria Iburu, and the canes are gathered for extracting sugar or preparing vinaigre or a beverage resembling cider. Sir John Kirk also describes it as one of the richest of fodder grasses. Although typically a perennial with long rhizomes creeping in the mud of swamps, lakes and rivers, it seems on temporarily flooded land to flower frequently the first year and then to behave as an annual. Such specimens (*Lécard*, 164, 244, 253; *Chevalier*, 9455; *Schweinfurth*, 2291, 2295) are mostly very meagre and slender, but the structure and appearance of the spikelets are the same as in typical stagnina.

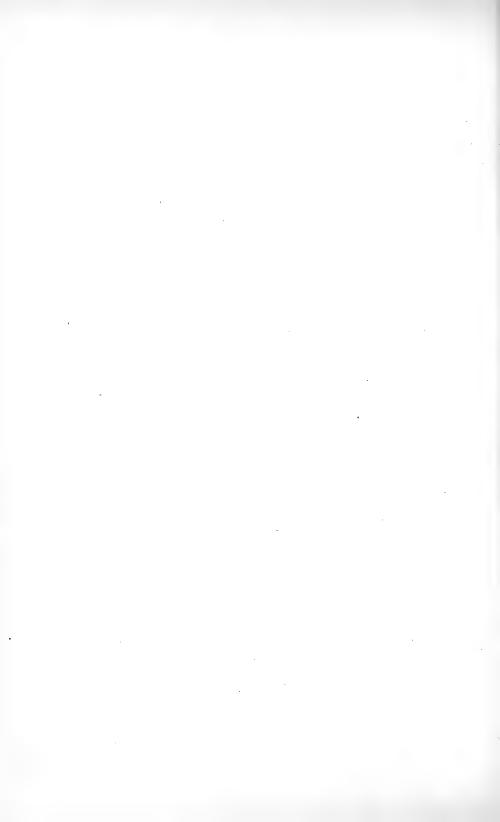
9. E. jubata, Stapf. Base unknown. Culms somewhat stout, terete, glabrous and smooth. Leaf-sheaths terete, striate, smooth and glabrous, longer than the internodes; ligules represented by a transverse fringe of fine hairs with a more or less discoloured finely pubescent zone above it or (in the uppermost leaves) the latter only present; blades linear from a slightly rounded and constricted base, tapering to a fine point, 4-6 in. by 3-4 lin., flat, dark green, slightly flaccid, quite glabrous, rough upwards on both sides and along the margin, otherwise smooth, midrib slender, flat and whitish above, primary lateral nerves very indistinctly differentiated above, 3 or 4 on each side. Panicle laterally exserted from the uppermost sheath and equalled or overtopped by its blade, subflexuous, linear-lanceolate in outline, very dense, obscurely or distinctly lobed, jubate from the numerous slender awns, 4-5 in. long; axis almost completely hidden by the crowded branches, angular, scabrid at the angles; branches irregularly approximate or fascicled, suberect, more or less flexuous, the longest about 1 in. by 2 lin. (excluding the awns), forming sessile very dense about 4-ranked simple false spikes; rhachis slender, triquetrous, $\frac{1}{4}$ lin. wide, with scaberulous angles, hispid-tomentose or setulose at the base; pedicels mostly paired, very short, scaberulous, with minutely discoid tips. Spikelets very close, oblong to lanceolate-oblong, acuminate, 11 lin. long (excluding the awns), awned, pale green or tinged with vivid purple. Glumes thin, very sparingly and minutely hairy, finely nerved; lower broadly ovate to ovate-oblong, acute or mucronulate, half the length of the spikelet, 3- to sub-5-nerved; upper corresponding in length and outline to the spikelet, produced into a fine scaberulous awn up to 3 lin. long, 5-7-nerved. Lower floret barren: valve very similar to the upper glume, but 7-nerved and the awn up to over 6 lin. long; valvule lanceolate-oblong, acute, distinctly shorter than the valve. Upper floret &, oblong, apiculate or mucronulate, moderately convex on the back, apiculus or mucro scaberulous, 1-1\frac{1}{4} lin. long, whitish, polished; valve and valvule papery-crustaceous. Grain broad-elliptic in outline, $\frac{3}{8}$ lin. by nearly $\frac{1}{4}$ lin.

 ${\bf Mozambique\ Distr.\ Nyasaland:\ Nyika\ plateau;\ Mwaremba,\ {\it McClounie},\ {\bf 20!}$

Imperfectly known species.

10. E. divaricata, Anderss. in Peters, Reise Mossamb. Bot. 549. A weak pale green tufted grass, ½ ft. high. Culms divaricate, branched from the base. Leaf-sheaths glabrous, with yellowish nodes; ligules 0; blades spreading, narrowly linear, 2-3 in. by 1-1½ lin., flat, glabrous except for a few tubercle-based cilia near the base, with slightly rough margins. Inflorescence of 4-7 divaricately spreading false spikes, ½ in. distant and bare at the base; axis angular, sulcate, glabrous; rhachis of the spikes glabrous except for a very few hairs. Spikelets 4-ranked, sessile, ventricose-globose, glabrescent. Glumes unequal; lower subrotund, clasping, obtuse or indistinctly mucronate, 3-nerved, finely hairy along the margins, upper as long as the spikelet, obtuse, dorsally very convex, 5-nerved,





clvii. gramineæ (Stapf).

with a hyaline subciliate margin. Lower floret 3; valve similar to the upper glume, acute, ciliate; valvule membranous-hyaline. Upper floret &, acute; valve convex on the back, cartilaginous; valvule of similar substance, embraced by the valve.—P. Echinochloa, Durand & Schinz, Consp. Fl. Afr. v. 748.

Mozambique Distr. Portuguese East Africa: on damp plains near Tette, Peters.

This may be a species of Brachiaria.

68A. ACROCERAS, Stapf.

Spikelets ovate-oblong to oblong, bluntly and callously crested, subterete, falling entire from the pedicels, usually 2-nate or upwards solitary, more rarely fascicled, secund and abaxial on the angular rhachis of racemosely arranged mostly loose simple or sometimes compound spiciform racemes; lower floret of or barren, with a welldeveloped valvule; upper floret \(\Delta \). Glumes subsimilar, membranous, pale below, greenish upwards or greenish all over, with a callous dark green laterally compressed terminal crest which is the end of a short subterminal keel, the lower usually shorter, more or less ovate-lanceolate and 3-nerved, the upper oblong, 5-nerved. Lower floret equalling the upper glume, or almost so: valve very similar to the upper glume; valvule equal to the valve or slightly shorter, hyaline, finely 2-keeled. Upper floret: valve subcoriaceous, smooth, oblong, very obscurely keeled or broadly rounded on the back, with a blunt callous green laterally compressed apical crest, narrowly involute with firm margins, faintly 5-nerved; valvule equalling the valve and similar in substance, with rounded keels, each ending in a minute more or less recurved callous tip. Lodicules 2, cuneate, fleshy. Stamens 3. Styles distinct; stigmas large, plumose, dark, exserted laterally above the middle. Grain tightly enclosed by the hardened valve and valvule, oblong, dorsally flat, ventrally convex; hilum filiform, as long as or usually much shorter than the grain, rarely punctiform. Embryo obovate, short .-Perennial or annual, usually with a long prostrate and rooting base; blades lanceolate to linear, often from a subamplexicaul or amplexicaul base with very numerous short more or less distinct transverse veins; ligules reduced to a ciliolate rim or quite obscure; panicles of distant slender secund spiciform or racemiform branches, mostly bearing spikelets from the base or near it; spikelets quite glabrous and smooth.

Species about 9 in the tropics of both hemispheres.

In the course of working out the African species of *Panicum* it became manifest that the species referred here could not be retained in Panicum as understood in this work. The uncertainty of the affinity was already recognised by Hitchcock and Chase, who in their account of the North American species of *Panicum* (in Contr. U.S. Nat. Herb. xv. 325) enumerate it among the "miscellaneous species."

It is interpolated here after Echinochloa more for technical reasons than on account of close affinity. The latter lies rather with *Chloachne*, which in the structure of the axes of the panicles and the laterally compressed herbaceous tips of the glumes and the lower valve and other particulars recalls Acroceras. It has, however, one peculiarity in common with Echinochloa, that is the curiously gaping tips of the fertile floret, due to the recurving of the thickened ends of the keels of the valvule.

Perennial; spikelets more or less oblong and plump.

Blades broad-lanceolate from a suddenly constricted

base, 3–5 in. by 4–9 lin. ... 1. A. oryzoides.

Blades linear from a rounded or subcordate base, $2\frac{1}{2}$ -8 in.

... 2. A. macrum. by $1\frac{1}{2}-4 \, \text{lin.}$

Annual; spikelets more or less lanceolate.

Culms simple or sparingly branched above the ascending, prostrate or floating base; blades 3-12 in. by

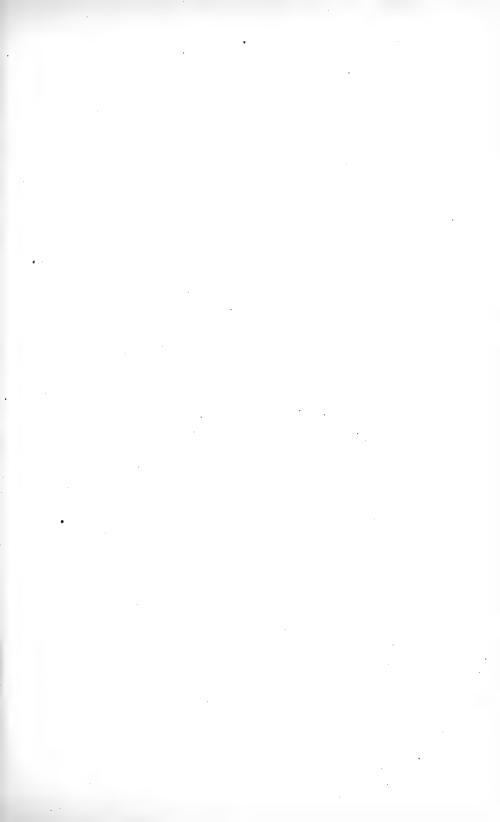
 $3-7\frac{1}{2}$ lin., amplexicaul; spikelets bluntly apiculate 3. A. amplectens.

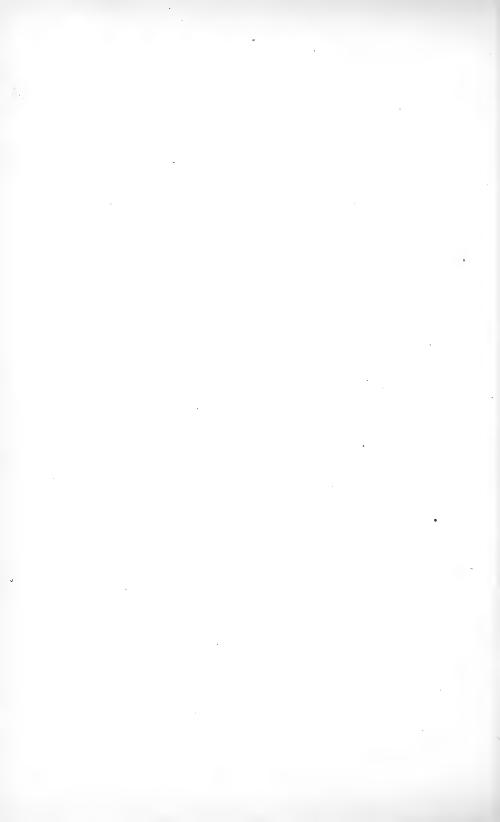
Culms much-branched below, forming loose leafy tufts

from which the flowering culms rise; blades 1-3 in.

by 2-3½ lin., flaccid; spikelets subulate-apiculate 4. A. basicladum.

1. A. oryzoides Stapf. Perennial, 2-4 (rarely to over 6) ft. high. Culms ascending from a branched prostrate or rambling or climbing and often rooting base, the erect parts simple or sparingly branched, the internodes of the base frequently strongly compressed, wiry, short or long and like the others very smooth and glabrous, the upper at length mostly somewhat elongated and exserted, sulcate or angular. Leaf-sheaths subherbaceous, tight, firm, terete, prominently striate, densely ciliate, otherwise quite glabrous and very smooth, rarely with a few hairs upwards; ligules very narrow, membranous, ciliolate or almost suppressed; blades lanceolate to lanceolate-linear from a broad suddenly constricted and rounded base, long-acuminate with a fine callous point, 3-5 (occasionally 7) in. by 4-9 lin., spreading, firm, flat, more or less greyish-green, glabrous or finely tomentellous and ciliate at the rounded base, smooth except along the scabrid finely cartilaginous margins, midrib fine below, primary nerves 3-6 on each side, distinct on both sides or at least below, with up to 7 secondary nerves between, which are connected by numerous minute cross-veins. Panicles erect, straight or nodding, at length more or less exserted, 3-10 in. long, made up (in the African specimens) of 4-7 suberect interruptedly spiciform or racemiform branches distantly disposed on a slender semiterete and facially flat or sulcate or upwards gradually subtriquetrous to triquetrous smooth common axis, branches villosulous at the very base, the longest half to two-thirds the length of the panicle, more or less triquetrous with scabrid lateral angles, a flat or subconvex back, up to $\frac{1}{4}$ lin. wide, and a more or less broadly and bluntly keeled face, with upwards evanescent grooves on alternate sides of the successive internodes which are $2-2\frac{1}{2}$ lin. long, at its nodes bearing from the base or more rarely above it solitary or paired or scantily clustered





spikelets or in the lower part of the panicle short secondary branches of a similar structure; pedicels stiff, angular, scaberulous with truncate tips, if paired or clustered, one or several very short to short, the longest 2-3 lin. long. Spikelets lanceolate-oblong, bluntly apiculate, 2-2½ lin. long, pale green with darker tips, quite glabrous. Glumes membranous, unequal, with green nerves; lower lanceolate from an ovate base, acuminate, two-thirds to four-fifths the length of the spikelet, 3-nerved, middle nerve more prominent upwards and often ending with a short blunt keel; upper glume corresponding in length and shape to the spikelet, 5-nerved, with laterally slightly compressed thick blunt tips. Lower floret barren: valve very similar to the upper glume, but usually slightly shorter; valvule more or less reduced, oblong, acute, keels finely scaberulous. Upper floret oblong, bluntly mucronulate from the valve, 2 lin. long, smooth, white, at length turning brownish, glossy; valve and valvule coriaceous, mucro of the valve and often the tip below it minutely rough, tip of the valvule subcucullate, slightly recurved and reversedly ciliolate on the inflexed margin; anthers 1 lin. long.— Panicum oryzoides, Sw. Prodr. Veg. Ind. Occ. 23; Kunth, Enum., i. 129; Steud. Syn. Pl. Glum. i. 80; Rendle, Cat. Afr. Pl. Welw. ii. 172; not of Arduino. P. zizanioides, H. B. & K. Nov. Gen. & Spec. i. 100; Kunth, Rév. Gram. i. 233, t. 28, and Enum. i. 118; Nees, Agrost. Bras. 143; Trin. Pan. Gen. 188, and in Mém. Acad. Pétersb. 6^{me} sér. iii. 276; Steud. l.c. i. 75; Doell in Mart. Fl. Bras. ii. ii. 228; Hitchcock & Chase in Contrib. U.S. Nat. Herb. xvii. 531. P. balbisianum, Schult. Mant. ii. 254. P. numidianum, Hook. Niger Fl. 560; not of Lam. P. pseudoryzoides, Steud. l.c. P. Ridleyi, Hack. in Trans. Linn. Soc. ser. 2, Bot. iii. 400 (name only). P. latifolium, Hook. f. Fl. Brit. Ind. vii. 39; not of Linn. P. ogowense, Franch. Contr. Fl. Congo Franç. in Bull. Soc. Hist. Nat. Autun, viii. 344 (reprint, 36); De Wild. & Durand in Bull. Herb. Boiss. 2_{me} sér. i. 61. P. lutetense, K. Schum. in Engl. Jahrb. xxiv. 332.

Upper Guinea. Sierra Leone: Jigaya, 1100 ft., Thomas, 2747! Bumbuna, 650 ft., Thomas, 1963! 2032! 3256! Yetaya, 1100 ft., Thomas, 2322! 2330! Mabonti, 550 ft., Thomas, 3564! Pandembu, 300 ft., Thomas, 813! Binkolo, 500 ft., Thomas, 1755! Mabum, Thomas, 1617! Malotoka, Thomas, 1355! Rowala, 500 ft., Thomas, 1072! Binkolo, 570 ft., Thomas, 1864! Yonibana, Thomas, 4279! 4714! Kanya, 1000 ft., Thomas, 2943! Falaba river, Scott Elliot, 5097! French Sudan: shady borders of streams near Moussaia (Upper Niger), Chevalier, 399! French Guinea: moist land near Timbo, Pobéguin, 1712! South Nigeria: Lagos, Millen, 98! Dawodu, 94! Ibu, Vogel, 20! Abbeokuta, Irving! Opobo, Jeffreys! Northern Nigeria: Jeba, Barter! Cameroons: Bipinde, Zenker, 3794 a! 3805! in open bush near Batanga, Bates, 170!

North Central. Middle Oubangui: between Bangui and Kemo, Chevalier, 5278!

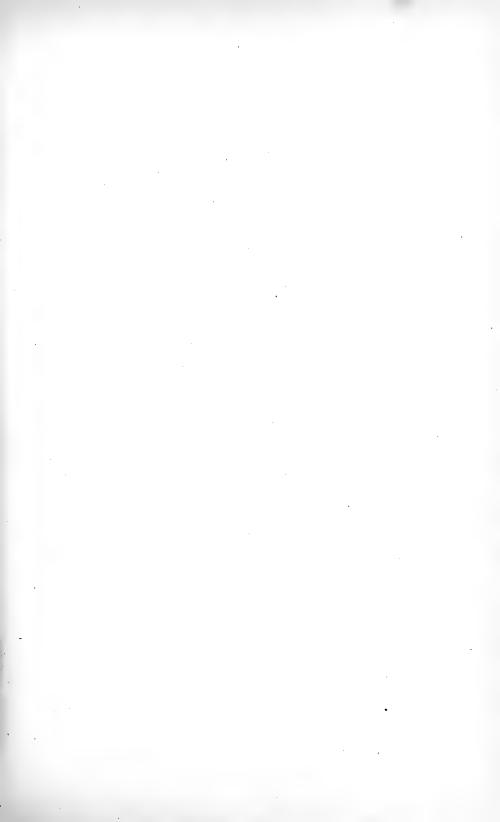
Nile Land. Uganda: water edge in Kipayo forest, 4000 ft., Dummer,

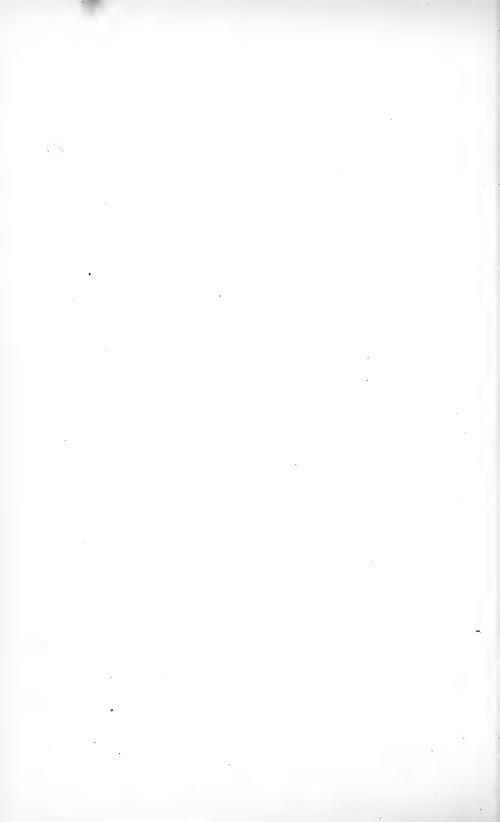
Lower Guinea. Gaboon: Corisco Bay, Mann, 1894! Ogowe, Thollon, 832! Fernando Po, Mann, 1176! Belgian Congo: Cataracts Distr., in underwood along borders of streams near Lutete, 1600 ft., Hens, A. 194! Stanley Pool Distr.;

Lower Kasai river, Vanderyst, 4774! Mokaba, Vanderyst, 3611! Kisantu, Gillet, 460! 581! Angola: Pungo Andongo; in thick damp woods, climbing with aerial roots, on Calemba Island in the Cuanza river, Welwitsch, 7429!

Tropics of both hemispheres.

2. A. macrum, Stapf. Perennial, up to over 2 ft. high from a slender creeping rhizome with extravaginal innovations. Culms slender, ascending, or prostrate at the base and covered there with short papery to membranous cataphylls and the remains of halfdecayed sheaths or bared at length by their decay, above this base 6- to many-noded, sparingly branched, the upper internodes longexserted, all terete, prominently striate, glabrous and smooth. Leafsheaths subherbaceous, terete, moderately tight, ciliate, otherwise quite glabrous, or pubescent with minutely tubercle-based hairs, smooth; ligules reduced to a ciliolate rim sometimes quite obscure; blades linear from a slightly rounded to subcordate and semiamplexical base, tapering to a slender subcallous point, $2\frac{1}{2}$ -8 in. by $\frac{1}{2}$ -4 lin., or the lower sometimes still shorter, flat, subsucculent, somewhat rigid (at least the upper), obliquely erect, very pale green, glabrous or rigidly ciliate at the rounded base, rarely loosely pubescent, margins finely cartilaginous, smooth below, rough upwards, or smooth almost throughout, midrib and primary lateral nerves (3-4 on each side) fine, distinct only below, with 3-4 secondary nerves in the intervals, cross-veins short, sometimes very obscure. Panicle long-exserted, scanty, up to 8 in. long, of 5-1 erect or spreading spiciform secund branches, widely distant on a very slender subterete or towards the lower nodes semiterete and channelled or in the upper part triquetrous and scabrid common axis or the inflorescence reduced to a single interrupted spiciform raceme; branches villosulous at their insertion, the longest up to $2\frac{1}{2}$ in. long, triquetrous at least upwards, with scaberulous or downwards smooth angles and a flat or convex back, $\frac{1}{5} - \frac{1}{4}$ lin. wide, and an acutely keeled face, bearing at the nodes (2-4 lin. distant) from the base (rarely from some distance above it) mostly paired spikelets; pedicels stiff, angular, scaberulous, appressed, with truncate tips, one very short, the other up to 1-2 lin. long. Spikelets oblong, shortly and bluntly apiculate, $2-2\frac{1}{4}$ lin. long, pale green with darker tips, quite glabrous. Glumes thinly membranous, finely nerved; lower ovate-lanceolate, 3-nerved, middle-nerve raised towards the tip into a more or less bluntly ending keel; upper glume as long as the spikelet, oblong, 5-nerved, shortly keeled at the tip, the keel produced into a small short blunt appendage. Lower floret 3: valve very like the upper glume; valvule almost as long as the valve, narrowly oblong, minutely truncate, keels scaberulous, flaps reversedly ciliate upwards; anthers Upper floret &, oblong, bluntly apiculate, up to $1\frac{1}{2}$ lin. long. $2-2\frac{1}{4}$ lin. long, whitish, smooth; valve and valvule coriaceous, apiculus of valve roundish, very short, of valvule minutely and bluntly 2-toothed and slightly recurved.—Panicum zizanioides,





Stapf in Dver, Fl. Cap. vii. 402; Wood, Natal Pl. t. 154; Rendle in Journ. Linn. Soc. Bot. xl. 229; Eyles in Trans. Roy. Soc. S. Afr. v. 301; not of H. B. & K.

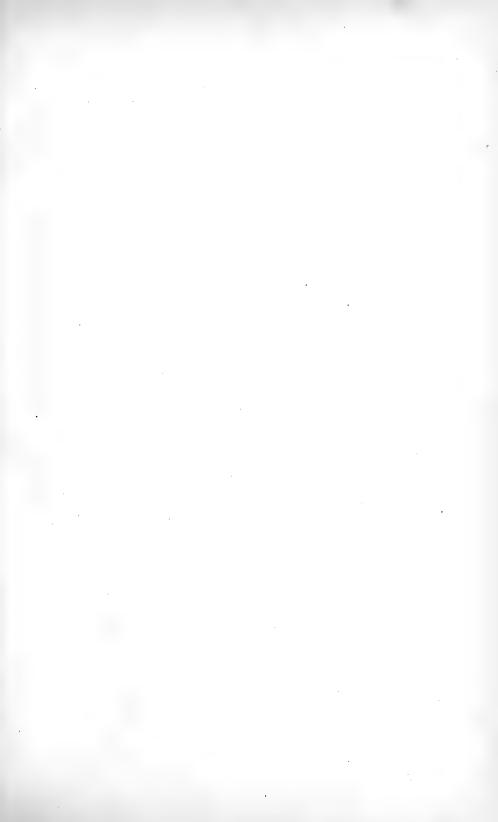
Lower Guinea. Angola: Mossamedes; in the mud of the Cunene marshes, Pearson, 2024! Mozambique Distr. Portuguese East Africa: in open woods near Beira, Swynnerton, 1596! Rhodesia: Salisbury, Mrs. Craster, 22! 81!

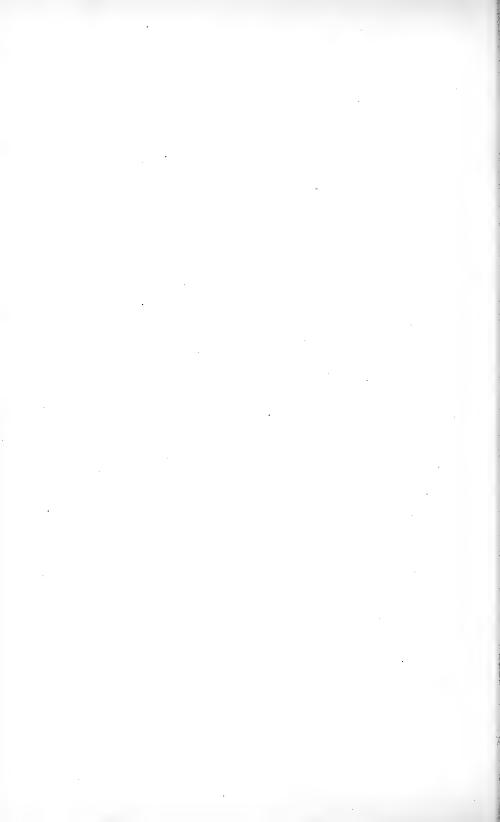
3. A. amplectens, Stapf. Annual, $2-2\frac{1}{2}$ ft. high. Culms geniculately ascending from an often prostrate branched and rooting base, or sometimes floating in the water, the erect parts simple or sparingly branched, rarely the whole plant erect and simple, moderately slender to stout, terete or the internodes of the prostrate base more or less compressed, soft, sulcate or angular, the intermediate and upper internodes (or sometimes all) more or less exserted. Leafsheaths subherbaceous, somewhat firm, loose or the upper tight, terete, prominently striate, ciliolate or ciliate, otherwise quite glabrous and very smooth; ligule none or represented by an obscure semicrescent rim; blades lanceolate to lanceolate-linear from a broad subcordate amplexicaul base, tapering from low down to a long slender point, 3-6 in. or sometimes to 1 ft. by 2-3 lin. at the middle and 3-7½ lin. at the base, obliquely erect or spreading, flat, soft, green to greyish-green, glabrous and smooth except along the scaberulous margins, midrib fine below, primary nerves 3-5 on each side, distant, distinct below only, with 3-4 secondary nerves between, connected by minute often very inconspicuous cross-veins. Panicles erect, at length more or less exserted, $\frac{1}{2} - \frac{3}{4}$ ft. long, of 4-6 straight or nodding (sometimes much so) secund subspiciform branches distant on a slender semiterete or upwards more or less triquetrous smooth common axis; branches obscurely villosulous at the very base, the longest one-half to two-thirds the length of the panicle, triquetrous, with downwards smooth, upwards scabrid angles and a flat subconvex back up to over \(\frac{1}{4}\) lin, wide and an acutely keeled face, bearing at its nodes (3-5 lin. distant) from the base, rarely from above it, mostly paired spikelets; pedicels stiff, angular, finely scaberulous to scabrid with truncate tips, one very short, the other 1-3 lin. long. Spikelets more or less appressed to the rhachis, lanceolate to lanceolate-oblong, bluntly apiculate, up to over 3 lin. long, pale green with darker tips, quite glabrous. Glumes membranous, finely nerved; lower lanceolate from a clasping base, acuminate, 3-nerved, middle nerve widened towards the tip into an acutely or bluntly ending scaberulous keel; upper as long as the spikelet, ovate-lanceolate, long-acuminate, 5-nerved, apiculus laterally compressed, almost square or round, thick. Lower floret of or barren: valve very similar to the upper glume; valvule narrowly oblong, over 2 lin. long, minutely truncate, scaberulous, or more or less reduced; anthers if any 1 lin. long. Upper floret \nsubseteq , narrowly oblong, bluntly apiculate, over $2\frac{1}{2}$ lin. long, smooth, pale; valve and valvule coriaceous, apiculus laterally compressed, obtuse, minutely rough, margin delicately ciliate below it, tip of valvule subcucullate and slightly recurved and reversedly ciliolate on the inflexed margin; anthers over 1 lin. long. Grain oblong-lanceolate in outline, planoconvex, white; hilum filiform, as long as the grain; embryo less than half the length of the grain.—P. zizanioides, var. angustatum, Stapf ex A. Cheval. Sudania, 32 (name), 81.

Upper Guinea. Senegambia: Casamance; Ziguimber, Chevalier, 2188! French Guinea: Baffing Valley, Pobéguin, 1713 bis! French Sudan: Middle Niger; Koulikoro, Chevalier, 2187! Ségou, Lécard, 246! North Central. Upper Oubangui: Mbou-Kou-Griko, Chevalier, 5574!

Nile Land. Jur: Ghattas' Great Seriba, Schweinfurth, 2330!

4. A. basicladum, Stapf. Annual, up to $2\frac{1}{2}$ ft. high, from a long. prostrate much-branched base, forming loose leafy tufts from which the flowering culms rise. Culms quite glabrous and smooth, slender, terete, weak, many-noded, the prostrate base bare owing to the early decay of its sheaths, its internodes 1-2 in. long, copiously rooting from the nodes, the numerous branches ascending, of very variable height, from a few inches to $2\frac{1}{2}$ ft. long, apparently all flowering, their lower internodes sheathed, short to very short at the base, increasing upwards in long culms to 5 in. and more, and then long-exserted. Leaf-sheaths subherbaceous, soft, loose or the upper tight, terete, ciliate, otherwise glabrous and smooth; ligule none or represented by an obscure minutely ciliolate line; blades linearlanceolate to linear from a rounded semi-amplexical base, tapering to an acute point, 1-3 in. by $2-3\frac{1}{2}$ lin. or the upper of the longest culms linear and up to 6 in. by 2 lin., flat, flaccid, green, glabrous, margins cartilaginous, smooth below, scaberulous upwards, midrib very fine, primary lateral nerves about 3 on each side, faintly distinct on the lower side only, with 3 secondary nerves between them connected by mostly very inconspicuous cross-veins. Panicles erect, straight, those of the longest culms long-exserted, 3 to over 9 in. long, of 2-5, rarely more, straight usually much spreading secund often interrupted spiciform branches, very distant on a very slender semiterete smooth or upwards more or less triquetrous and scaberulous or scabrid common axis; branches subvillosulous at the very base, the longest from half to two-thirds the length of the panicle, triquetrous, with scaberulous or downwards almost smooth angles, a flat or subconvex back, up to \frac{1}{4} lin. wide, and an acutely keeled face, bearing at the nodes (4-6 lin. distant) from the base, more rarely from above it, mostly paired spikelets; pedicels stiff, angular, scaberulous, with truncate tips, one very short, the other 2-3 lin. long. Spikelets appressed to the rhachis, linear-lanceolate, subulateapiculate, 2½ lin. long, pale green with darker tips, quite glabrous. Glumes thinly membranous, finely or obscurely nerved; lower





lanceolate to lanceolate-oblong, 3-nerved, middle-nerve suddenly widened towards the tip into an acutely ending keel; upper as long as the spikelet, oblong, acuminate, 5-nerved, apiculus laterally compressed, oblong, obtuse, very minutely scaberulous. Lower floret barren: valve very similar to upper glume; valvule linear, almost as long as or distinctly shorter than the valve, subacute, with scaberulous keels. Upper floret \mbeta , linear to linear-oblong, bluntly apiculate, $2\frac{1}{2}$ lin. by slightly over $\frac{1}{2}$ lin., whitish, smooth: valve and valvule coriaceous, apiculus of valve short, obtuse, of valvule slightly recurved and subacute or 2-toothed; anthers $1\frac{1}{4}$ lin. long.

Lower Guinea. Belgian Congo: Stanley Pool Distr.; Kitebe, Vanderyst, 3642! 4118! 4144! 4145! between Leopoldville and Mombaxi, Gillet, 2619! 2704!

68B. COMMELINIDIUM, Stapf.

Spikelets oblong, subobtuse, subterete, falling entire (or subentire?) from the pedicels, usually 2-nate or solitary, more rarely fascicled, subsecund and abaxial on the angular rhachis of racemously arranged loosely or interruptedly spiciform racemes; lower floret barren with a more or less reduced valvule; upper floret \(\). Glumes similar in texture, membranous, greenish, with slightly callous tips; lower shorter, ovate from a clasping base, 3-nerved; upper oblong, broadly rounded on the back, 5-nerved, separated from the lower by a distinct internode. Lower floret equalling upper glume: valve very similar to upper glume; valvule much shorter than the valve, hyaline, with narrowly winged keels and upwards evanescent flaps. Upper floret: valve oblong-lanceolate, broadly involute with firm margins, minutely cucullate, with a small blunt apiculus, coriaceous, smooth with a dorsal semilunar depression at the base; valvule almost equalling the valve and similar in substance, with rounded keels and an entire tip, embraced by the valvule all along or the very tip free. Lodicules 2, cuneate, fleshy. Stamens 3. Styles distinct, plumose, purplish, exserted laterally towards the tip of the spikelet. Grain unknown.—Perennial from a prostrate rooting base, with much the habit of certain broadleaved Commelinæ or of Polyspatha; blades obliquely ovate, contracted at the base and articulated with the sheath, manynerved with transverse veins; ligules distinct, membranous; panicles of rather few branches, bearing spikelets from low down; spikelets quite glabrous and smooth, except at the mostly minutely puberulous tips.

Species 3, endemic in West Africa.

My observations on the affinity of Acroceras (see above) may be applied with even greater force to Commelinidium, which should have been placed between Chloachne and Microcalamus. The curious dorsal semilunar depression at the base of the fertile valve corresponds to a very considerable reduction of tissues, and in the mature state frequently leads to a rupture along its line. The portion of the valve immediately inside the line bulges slightly. The same structure

CLVII. GRAMINEÆ (Stapf). [Commelinidium.

occurs in Chloachne and Microcalamus and is also faintly indicated in some forms

As in certain species of Panicum, the spikelets seem sometimes to break up before dissemination, the second glume becoming detached and laying bare the back of the fertile floret.

Spikelets slightly under 2½ lin. long, linear-oblong, olive-

brown; lower glume 3-nerved 1. C. mayumbense.

Spikelets $2\frac{1}{2}$ -3 lin. long, somewhat plump, greenish; lower glume 5-nerved. ACLV (5 430) and 3-nerved Panicles 7-10 in. long, with a terete axis and horizontally

spreading branches; leaf-blades glabrous below ... 2. C. gabunense.

Panicles 1 to over 3 in. long, contracted, with a triquetrous

axis; leaf-blades finely pubescent below ... 3. C. nervosum.

1. C. mayumbense, Stapf. Perennial. Culms ascending from a prostrate or rambling base, emitting aerial roots from the lower nodes, many-noded, branched; flowering culms and branches up to 6 in. long, slender, terete, striate, each internode with a line of pubescence in the median plain of the supporting leaf. Leaf-sheaths shorter than the internodes, tight, terete, striate, densely ciliate along the margins and more or less bearded at the nodes, otherwise finely pubescent or glabrescent downwards, those supporting branches soon thrust aside; ligules short, truncate, rather stiffly membranous, finely ciliate; blades obliquely and broadly ovate- or ellipticlanceolate from a much contracted disarticulating base, acutely acuminate, 1½-2½ in. by 8-12 lin., quite flat, dark green, glabrous above except for a few small fine bristles, midrib fine, lateral primary nerves 3-4, very slender and slightly differentiated from the secondary nerves (about 6 per interval). Inflorescences 2-3, terminal and subterminal from the uppermost leaves, very shortly exserted with 2-3 ultimately horizontally spreading branches; axis 1-1\frac{1}{2} in. long, filiform, subterete, like all its divisions pubescent; branches similar to the axis but finer, up to $\frac{3}{4}$ in. long, bearing up to 3 pairs of spikelets; pedicels subangular, slightly thickened upwards, truncate, one very short, the other $1-1\frac{1}{2}$ lin. long. Spikelets linear-oblong, subacute, not quite $2\frac{1}{2}$ lin. long, olive-brown, glabrous except at the tip. Glumes minutely penicillate-puberulous at the very slightly callous tip, both 3-nerved; lower ovate, acute, half the length of the spikelet; upper corresponding in length and outline to the spikelet. Lower floret barren: valve very like the upper glume, but 5-nerved; valvule very thin, often shrivelled and appressed Upper floret \(\beta \), slightly shorter than the lower, to the fertile floret. pale-brown, polished; valve and valvule thinly coriaceous, the former broadly rounded on the back, involute margins of the valvule firm with delicate hyaline flaps downwards.—P. mayumbense, Franch, Contrib. Fl. Congo Franç. in Bull. Soc. Hist. Nat. Autun, viii. 343 (reprint 35); Th. & Hél. Durand, Syll. Fl. Congol. 633. P. gabunense, Rendle in Cat. Afr. Pl. Welw. ii. 172; not of Hack.

Lower Guinea. French Congo: Mayumbe Forest, Thollon, 1209. Belgian Congo: Equator Distr.; Lulanga, in humid soil on the banks of the Congo river,





900 ft., Hens, C. 101! Angola: Golungo Alto; in dense primitive forest near Cungulungulo, Welwitsch, 7174! 7208!

According to Welwitsch this grass grows socially in the shade of primitive

woods and disappears with cultivation.

(Hack.) 2. C. gabunense, Stapf. Up to over 3 ft. high. Culms ascending, emitting aerial roots, terete, striate, fistular, many-noded, simple, upwards sparingly pubescent, leafy all along. Leaf-sheaths tight, terete, less than half the length of the internodes, ciliolate along the margins and more or less bearded at the mouth, pubescent upwards, otherwise glabrous; ligules short, rotundate, membranous, glabrous; blades spreading, lanceolate-elliptic to elliptic from a rounded much constricted (almost petioloid) base, acuminate, 3-4 in. by $1\frac{1}{4}$ - $1\frac{1}{2}$ in., flat, firm, dark green, scaberulous with scattered small bristles above, glabrous below, midrib very slender, lateral primary nerves 5-6 on each side with 6-7 secondary in the interval, all very fine; crossveins delicate. Panicle broad-ovate, compound, open, rather loose, 7-10 in. long; axis terete, striate, obscurely puberulous; branches spirally arranged, pubescent in the axils, angular, scaberulous or hairy, divided almost from the base; branchlets bearing 3-5 spikelets; pedicels about 1 lin. long. Spikelets lanceolate, $2\frac{1}{2}-2\frac{3}{4}$ lin. long, greenish or suffused with violet. Glumes membranous, acute, 5-nerved, glabrous except for the minutely puberulous tips; the lower ovate, half the length of the spikelet, the upper ellipticlanceolate, as long as the spikelet. Lower floret imperfectly 3: valve similar to the upper glume, but obtuse; valvule linear, obtuse, shorter by one-third; anthers seen minute, sterile. Upper floret \u2212, lanceolate, with a subacute densely white-puberulous tip, obscurely keeled, whitish; valve and valvule coriaceous.—P. gabunense, Hack, in Verhandl, Bot. Ver. Brandenb, xxxi, 70; Durand & Schinz, Consp. Fl. Afr. v. 750.

Lower Guinea. Gaboon: Sibange Farm, in a dry river bed, Büttner, 555.

The description is taken entirely from Hackel, l.c. The large panicle and the glabrous under side of the leaf-blades seem to distinguish this species from both its congeners, whilst the nervation of the glumes (5-nerved instead of 3) adds another palpable character to distinguish it especially from *C. mayumbense*.

3. C. nervosum, Stapf. Perennial, rising to over 1 ft. Culms ascending from a prostrate or rambling base, emitting long aerial roots from the nodes, many-noded, upwards simple or branched; upper branches (if any) short, slender, terete, striate, each node with a line of pubescence in the median plane of the supporting leaf or at length glabrescent. Leaf-sheaths shorter, or the upper as long as or longer than the internodes, tight, terete, striate, densely ciliate along the margins, cilia very long towards the mouth, otherwise spreadingly pubescent all over; ligules truncate, stiffly membranous, ciliate, up to \(\frac{3}{4}\) lin. long; blades obliquely and broadly ovate- or oblong-lanceolate from a much constricted disarticulating (?) base, acutely

acuminate, 2-4 in. by $\frac{3}{4}$ - $1\frac{1}{3}$ in., quite flat, somewhat firm, dark green, very minutely stiffly and appressedly hairy above between the nerves, with some fine small bristles here and there, or glabrescent to almost quite glabrous, finely and softly pubescent below, transverse veins distinct, midrib fine, primary lateral nerves 3-5, very slender and slightly differentiated from the secondary nerves (about 6 per interval). Inflorescences 1-2, terminal or subterminal from the uppermost leaves, very shortly exserted, with up to 5 erect or suberect branches; axis \frac{1}{2} to over 2 in. long, filiform, angular, loosely hairy; branches similar to the axis but finer, the lower equalling half to over two-thirds of the panicle and in the longer panicles bearing up to 6 loosely disposed pairs of spikelets, in small panicles the spikelets rather crowded; pedicels angular, truncate, one very short, the other up to $\frac{1}{2}$ lin. long. Spikelets oblong, obtuse (rarely acute), $2\frac{1}{2}$ to almost 3 lin. long, somewhat plump, dull greenish, glabrous. Glumes membranous, prominently nerved, quite glabrous or with a few very minute hairs at the slightly callous tips; lower ovate, subacute, about half the length of the spikelet, 3-nerved; upper corresponding in length and outline to the spikelet, 5-nerved. Lower floret barren: valve verv like the upper glume; valvule very thin and appressed to the fertile floret. Upper floret \(\), as long as the lower, turning brown, polished: valve and valvule thinly coriaceouscrustaceous, the former obscurely keeled with a laterally compressed minutely puberulous apiculus, the latter subapiculate with the tip slightly recurved; anthers $1\frac{1}{2}$ lin. long.

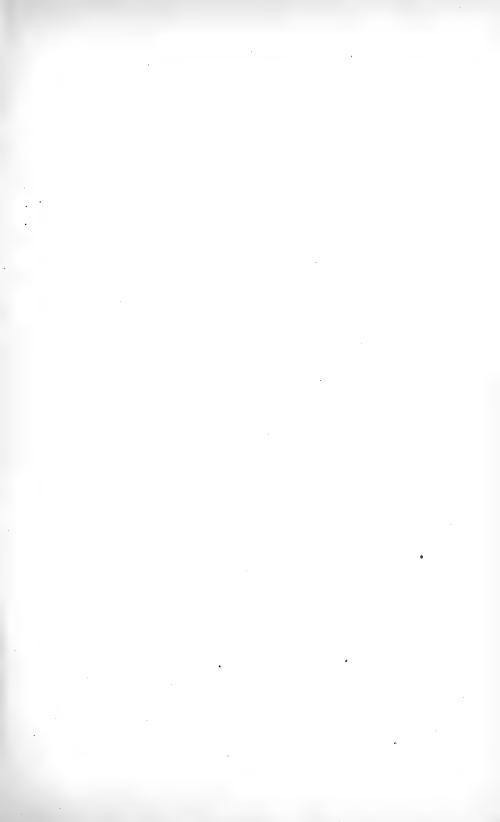
Upper Guinea. Ivory Coast: Guideko, in the basin of the middle Sassandra river, Chevalier, 16396! near Assikasso, in the region of the middle Comoé river, Chevalier, 22598!

Lower Guinea. Belgian Congo: Stanley Pool Distr.; between Leopoldville and Mombasi, Gillet, 2512!

Gillet's specimen is referred here with some doubt.

69. OPLISMENUS, P. Beauv. Flor. Owar. ii. 14.

Spikelets oblong to ovate-oblong or lanceolate, awned from the glumes, falling entire from the pedicels, in small clusters on a common axis or 2-nate or solitary, secund and abaxial on the angular rhachis of racemosely arranged densely or more rarely interruptedly spiciform racemes; lower floret or barren with a perfect or reduced or no valvule; upper floret \(\). Glumes similar in shape and texture, subequal, herbaceous to membranous, 3-7-nerved, both or at least the lower awned, more or less keeled upwards. Lower floret exceeding the glumes; valve resembling them, 5-9-nerved, muticous or mucronate or very shortly awned; valvule subequal to the valve and 2-nerved when perfect. Upper floret: valve oblong, broadly involute with firm margins, muticous, chartaceous to subcoriaceous; valvule equalling the valve and embraced by the valve all along.





Lodicules 2, broadly cuneate, often very delicate. Stamens 3. Styles distinct, long; stigmas terminally or subterminally exserted, plumose. Grain tightly enclosed by the somewhat hardened valve and valvule, oblong; hilum oblong, one-third to half the length of the grain.—Annual or more usually perennial, often weak grasses with slender many-noded ascending culms, the internodes of which have mostly a decurrent villous line adaxial to the subtending leaf; blades flat, thin, often slightly asymmetrical, often minutely crossveined; lower and intermediate racemes mostly distant, the upper decreasing upwards and more or less approximate; the awn of the lower glume the longest.

Species about 15, in all the warmer parts of the world, but mostly tropical.

Awns filiform, subobtuse, smooth, more or less viscous and

often vividly coloured upwards.

Spikelets or pairs of spikelets closely contiguous; if in racemes, the lower racemes mostly distant by more than their own length 1. O. hirtellus.

Spikelets or pairs of spikelets not contiguous, often conspicuously distant; racemes long, the lower equalling or exceeding the adjacent internode ... 2. O. compositus.

Awns capillary, flexuous, slightly rough, pale 3 O. Burmannii.

1. 0. hirtellus, P. Beauv. Agrost. 54, 168. Perennial, up to several feet (according to Mann up to 8 ft.) high. Culms slender, ascending (occasionally climbing in trees) from an often long decumbent or rambling rooting base, the internodes of which are mostly strongly compressed, while its nodes emit often long aerial roots, terete upwards, many-noded, branched from the base, simple or subsimple upwards, glabrous or frequently very shortly hairy upwards or along a line adaxial to the supporting leaf. Leaf-sheaths rather tight, strongly striate, densely ciliate along the margin, otherwise usually glabrous except at the frequently pubescent nodes, rarely shortly hirsute upwards or all over, or eciliate and altogether glabrous, short or long; ligules very short, truncate, ciliate; blades lanceolate to linear-lanceolate from a distinctly constricted and slightly rounded base, acutely acuminate, $1\frac{1}{2}$ -5 in. by 2-9 lin. (those of the lower leaves and barren shoots often small and ovate-lanceolate), flat, thin, flaccid to rigid, dull green, scantily and minutely hairy to almost velvety below, sometimes with scattered longer white hairs above, rarely quite glabrous, rough on the upper side, at least upwards, margins scabrid, midrib very slender, primary lateral nerves 2-4 on each side, usually obscure or not at all differentiated from the numerous secondary nerves, in the larger more rigid blades often with a tertiary nerve between each pair of secondary nerves and then mostly closely and finely striate above, frequently with short transverse veins. Inflorescence of 3-8 dense spike-like racemes on an erect straight or flexuous semiterete or upwards triquetrous glabrous or finely pubescent axis, sometimes ciliate along its lateral angles.

Racemes distant usually by more than their own length (the lower often by 1 in. or more), erect or obliquely spreading, linear, decreasing upwards, 12-13 lin. long, or all the racemes short and reduced to 2-3-spiculate clusters or solitary spikelets; rhachis usually terminated by a solitary spikelet, straight, triquetrous, dorsally flat, green or greyish-green from very minute appressed hairs, frequently fringed with tubercle-based bristles, tomentose or hispid at the base, internodes from less than \(\frac{1}{2} \) to 1 lin. long; pedicels 2-nate or solitary, very short and stout with truncate tips and usually a few bristles. Spikelets contiguous, ovate-oblong, $\bar{1}\frac{1}{2}$ -2 lin. long (excluding the awns), green to grevish-green, minutely bearded at the base; if clustered, then one or several of a cluster more or less reduced (in extreme cases to awns). Glumes subequal (the upper slightly longer), $1-1\frac{1}{4}$ in. long, thinly herbaceous, lanceolate to ovate-lanceolate in profile, produced into filiform subobtuse smooth upwards more or less viscous and purplish awns, hairy at least near the margins, rarely quite glabrous; the lower acute, 5-nerved, with the nerves near the margin, and an awn usually from 3-5 lin. long, in weak specimens or in the lower and often somewhat arrested spikelets of a raceme or cluster only $1\frac{1}{2}-2\frac{1}{2}$ lin. long, or (the other extreme) occasionally up to over 6 lin. long; upper subobtuse, 7-5-nerved with an awn 1-2 lin. long. Lower floret barren, rarely 3, equalling the spikelet: valve similar to the glumes, with a minutely notched tip, membranous, mucronate or very shortly awned, 7-11-nerved; valvule linear, hyaline, more or less reduced. Upper floret $\mbox{$\,\circlearrowleft$}$, oblong, acute or subcuspidate, $1-1\frac{1}{4}$ lin. long, whitish to brownish, polished: valve and valvule subcoriaceous, the former 7-nerved. Anthers pale pink, $\frac{3}{4} - \frac{7}{8}$ lin. long. Stigmas long, red. Grain $\frac{3}{4} - 1$ lin. long, convex on the back, almost flat on the face, with an oblong hilum, one-third the length of the grain.—Roem. & Schult. Syst. Veg. ii. 481; Kunth, Enum. i. 140; K. Schum. in Engl. Pfl. Ost-Afr. C. 104; Hitchcock in Contrib. U.S. Nat. Herb. xii. 229, xvii. 255; Hitchcock & Chase in Contrib. U.S. Nat. Herb. xviii. 344. O. africanus, P. Beauv. Fl. Owar. ii. 15, t. 68, fig. 1, and Agrost. 54, t. xi. fig. 3; Kunth, Enum. i. 140; Nees, Fl. Afr. Austr. 60; Durand & Schinz, Consp. Fl. Afr. v. 771, and Études Fl. Congo, 325; Hack. in Bolet. Soc. Brot. v. 211; K. Schum. l.c.; Franch. Contr. Fl. Congo Franc. in Bull. Soc. Hist. Nat. Autun. viii. 362 (reprint 50); Stapf in Dyer, Fl. Cap. vii. 416, including vars. capensis and simplex; De Wild. & Durand, Contr. Fl. Congo, fasc. ii. 73, and in Bull. Herb. Boiss. 2^{me} sér. i. 61; Rendle in Cat. Afr. Pl. Welw. ii. 184, and in Journ. Linn. Soc. Bot. xl. 224; De Wild. Études Fl. Bas- et Moyen-Congo, i. 11; ii. 12, and Miss. E. Laurent, 203; Th. & Hél. Durand, Syll. Fl. Congol. 636; Eyles in Trans. R. Soc. S. Afr. v. 302. O. loliaceus, H. B. & K. Nov. Gen. et Sp. i. 106; Kunth, Enum. i. 140, partly; Nees, Agrost. Bras. 266. O. setarius, Roem. & Schult. Syst. ii. 481; Poir. Encycl. iv. 741; Kunth, Enum. i. 139; Small, Fl. South-east. U.S. 84;

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Hitchcock & Chase in Contr. U.S. Nat. Herb. xviii. 344. O. brasiliensis, Raddi, Agrost. Bras. 40. O. velutinus, Schult. f. Mant. ii. 271; Kunth, Enum. I.c. O. oahuaensis, Steud. Nomencl. ed. 2, ii. 260. O. capensis, Hochst. in Flora, 1846, 114. O. undulatifolius, Rendle, Cat. Afr. Pl. Welw. ii. 184; not of P. Beauv. O. barbifultus, Hochst. ex Hack. l.c. O. simplex, K. Schum. in Engl. Glied. Veget. Usambara in Abh. Preuss. Akad. Wiss. 1894, 48 (name). O. compositus, Rendle, 1.c.; Cummins in Kew Bulletin, 1898, 81; not of P. Beauv. Panicum hirtellum, Linn. Syst. Nat. ed. 10, ii. 870, and Ameen. Acad. v. 391; Sw. Obs. 35; Steud. Syn. Pl. Glum. i. 44 (the West Indian plant). P. loliaceum, Lam. Encycl. iv. 743, only as to the West Indian plant; Trin. Gen. Pan. 124, and in Mém. Acad. Sc. St. Pétersb. 6me sér. iii. 212; Doell in Mart. Fl. Bras. ii. ii. 145, t. 23. P. africanum, Poir. Encycl. Suppl. iv. 275. *P. incanum*, Schum. in Schum. & Thonn. Beskr. Guin. Pl. 60. *P. velutinum*, G. Meyer, Prim. Fl. Esseq. 51; Steud. l.c. P. Kraussii, Steud. l.c. 45. P. compositum, Doell in Mart. Fl. Bras. ii. ii. 146, at least in part; not of Linn. P. compositum, var. i., Trin. Sp. Gram. Ic. t. 188; Baker, Fl. Maurit. 439. P. sylvaticum, Steud. l.c. 108, partly; not of Lam. P. sylvaticum, var. a, Trin. Gen. Pan. 124, and in Mém. Acad. Pétersb. 6me sér. iii. 212. P. pseudoundulatifolium, Jardin, Aperçu Fl. Gabon. 1891, 15; not of Roem. & Schult. Orthopogon sp., R. Br. Prodr. 194, in obs. O. hirtellus, Spreng. Syst. i. 306; not of Nutt. O. loliaceus and O. velutinus, Spreng. l.c. O. africanus, Sweet, Hort. Brit. ed. i. 448.

Upper Guinea. Cape Verd Islands: S. Nicolao; Monte Gordo, 5000 ft., Lowe! Foge; Mount Queimado, Lowe! Sierra Leone: in forest near Lester Peak, Scott Elliot, 3854! Mamaha, Thomas, 4639! (*partly) Ronietta, Thomas, 5401! Kumrabai, Thomas, 6791! Pujahun, Thomas, 7987! and without 5401! Kumrabai, Thomas, 6791! Pujahun, Thomas, 7987! and without precise locality, Don! French Guinea: Baffing Valley, Pobéguin, 1737! Liberia: within 20 miles of Kakatown, Whyte!* Ivory Coast: Beuroukru, in primary forest, Chevalier, 16572!* Ashanti: Assin Yan Kumassi, Cummins, 142! Gold Coast: Akwapim, Johnson, 781!* Aburi Hills, Johnson, 294! and without precise locality, Thonning. Togo: Sokoda-Baravi, in savannah, Schroeder, 159! Southern Nigeria: Lagos; in shady places in the Ikoyi bush, Dalziel, 1324!* MacGregor, 301!* Chama, Koto, Oware and Benin, Beauvois! Agege, Kitson! Oban, Talbot, 849! Northern Nigeria: in shady situations on the Kebba road, Parsons, 26! Cameroons: Cameroon Peak, 6000 ft., Johnston, 96! Yaunde Station, Zenker & Staudt, 38! 483! 647!* Johann-Albrecht Höhe, Staudt, 450! Bipinde, Zenker, 1214!* Buea, Preuss!* and without precise locality (probably near Victoria), Preuss, 1305! 1355!* in shady bush near Batanga, Bates, 86! Fernando Po, Mann, 112! Vogel, 140! Prince's Island, Barter, 1969!* Pico de Papagaio at 1000 ft., Welwitsch, 2926!*

Lower Guinea. S. Thomas Island: by the shore at Santa Anna, and at Angolares, 150 ft., Moller and Quintas, 142!* at 2000 ft., Mann!* Monte Caffé, 1000–2500 ft., Welwitsch, 2886!* Moller! and without precise locality, Don! Macambrara, Santa Maria, 3900–4100 ft., Moller, 141!** summit of the Peak, 6900 ft., Mann!** Santa Maria, 3900–4100 ft., Moller! Gaboon: without precise locality, Thollon, 654!* Jardin! French Congo: Loango; at the Makunga spring near Chinchoxo, Soyaux, 81! and without precise locality, Thollon!* Belgian Congo: Lower Congo. Smith! Stanley Pool Distr.; Lower Kasai river, Vanderyst, 4320!* Kitebe, Vanderyst, 4068! Kimuenza

and Kisantu, Gillet, 466; Tshumbiri, Laurent; Ngombi, Demeuse. Kwango Distr.; common on the lower Kwango to the Kasai river, Vanderyst, 4274! Kikiwit, Vanderyst, 2963! Bangala Distr.; in woods at Lisha, Hens, 151! 157! Angola: Golungo Alto; common in shady woods on the rivers Guiapose, Cuango, etc., Welwitsch, 7186! 7199! 7200! Pungo Andongo; in shady woods between the Præsidium and Luxillo, Welwitsch, 7391!

Nile Land. Uganda: Toro, Tufnell! in dense forest near Kipayo, 4000 ft., Dummer, 759! Entebbe, on the lake shore, 3900 ft., Dawe! near the Victoria Nyanza, Mailland, 162! British East Africa: Nairobi, Linton, 220!

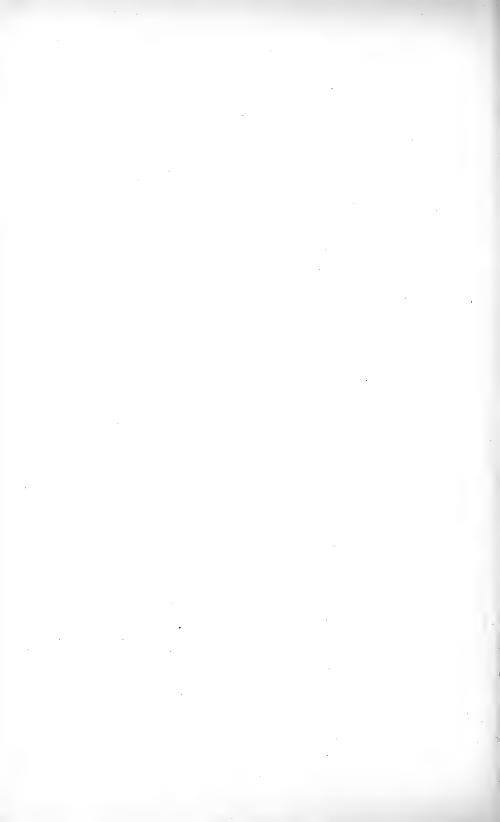
Mozambique Distr. German East Atrica: Usambara; virgin forest near Amani, Broun, 375!* Mbarama, Holst, 2496! Kilimanjaro; Marangu, 4500 ft., Volkens, 1432! at 5300 ft., Johnston, 63! Rhodesia: Victoria Falls, Rogers, 13284! Livingstone, Rogers, 7400! Gazaland: Chipete forest, 3800 ft., Swynnerton, 409!*

Also in South Africa and the Mascarenes, in the warm parts of America from Georgia and the Gulf States southwards, and in the Sandwich Islands. The size of the spikelets, the length of the awns and their number in the raceme are apparently dependent on the vigour of the plant, the first two characters varying frequently in the same individual or the same raceme as much as they do between the individuals of a given collecting or a limited area. Robust states with longer and more linear-lanceolate blades, longer racemes and longer awns represent the O. loliaceus of America. They are marked with an asterisk (*) in the enumeration given above. More meagre forms with lanceolate to lanceo. late-ovate blades, reduced inflorescences, very short racemes and mostly shorter awns occur throughout the area, but prevail, or occur to the exclusion shorter awns occur throughout the area, but prevail, or occur to the exclusion of the other state, towards the northern and southern limits of the area. They correspond to the O. setarius of authors. They intergrade with typical O. hirtellus, as already observed by Hitchcock & Chase (Grass. West Ind. in Contr. U.S. Nat. Herb. xviii. 344), and are not marked off in this place. Another extreme, with delicate culms and small narrow blades (1–2 in. by 2–3 lin.) and the racemes replaced by small clusters with partly arrested spikelets or by solitary spikelets, was named O. simplex by K. Schumann, and described by me as a variety of O. africanus. The few specimens referable to it are indicated above by a double asterisk (**). O. capensis of Hochstetter (O. africanus, var. capensis, Stapf) is intermediate between it and the "setarius" form. The amount of indumentum is very variable in the leaves as well as in the infloramount of indumentum is very variable in the leaves as well as in the inflorescences and apparently is not correlated with any structural differences or with geographical distribution.

Dawe states that this is the grass on which the natives of the neighbourhood of Entebbe feed their horses.

2. O. compositus, P. Beauv. Agrost. 54. A perennial grass with all the vegetative characters of O. hirtellus, but on the whole more robust. Inflorescence up to 1 ft. long, secund or subsecund, of up to 10 or more loose mostly interruptedly spiciform racemes on a flexuous downwards semiterete otherwise triquetrous usually glabrous and almost smooth axis, or sometimes ciliate along its lateral angles, rarely spreadingly hairy all over; racemes distant, at least the intermediate, by less than their own length, the lowest by 1-2½ in., erect or more or less spreading, the uppermost reduced to clusters of spikelets gathered in a long terminal raceme which is very like the lateral racemes, the longest 1 to over 3 in. long, rarely all short and the whole inflorescence as it were represented by a terminal interrupted spike-like raceme; rhachis flexuous, triquetrous, terminated by a spikelet, green or greyish-green, glabrous or sparingly (very rarely copiously) ciliate with fine soft spreading hairs, bearded at the





base; internodes mostly $1\frac{1}{2}-2\frac{1}{2}$ lin. long, often irregularly longer or shorter; pedicels 2-nate or solitary, very short and stout with truncate circular tips and usually a few bristles. Spikelets lanceolate to lanceolate-oblong, acuminate, $1\frac{1}{2}$ —2 lin. long (excluding the awns), green to greyish-green, often with purple tips or altogether redpurple, minutely and often very scantily bearded at the base. Glumes subequal, $1\frac{1}{4}$ lin. long, thinly herbaceous, lanceolate to lanceolate-oblong in profile, produced into slender filiform smooth upwards more or less viscous and purple awns, sparingly hairy, the lower towards the margins, the upper upwards, rarely quite glabrous, the lower gradually, the upper more abruptly passing into the awn, the lower 5-, the upper 7-9-nerved, awn of the lower up to over 5 (occasionally 8) lin. long, if the spikelets be paired usually one only with a long awn; awn of the upper glume 1-11 lin. long. Lower floret barren, equalling the spikelet: valve similar to the upper glume, abruptly apiculate, mucronate or with a very short awn, 9-nerved; valvule very much reduced or 0. Upper floret \forall , oblong, acute, $1\frac{1}{4}$ lin. long, whitish to brownish, polished; valve and valvule subcoriaceous. Grain oblong, dorsally compressed. Embryo onethird the length of the grain.—Roem. & Schult. Syst. ii. 484; Kunth, Enum. i. 141; Benth. Fl. Austr. vii. 491; Duthie, List Fodd. Grass. N. Ind. 13; Durand & Schinz, Consp. Fl. Afr. v. 771; Hook. f. Fl. Brit. Ind. vii. 66; Chiov. in Ann. Istit. Bot. Roma, viii. 310. O. elatior, P. Beauv. Agrost. 54, 168. O. indicus, Willd. in Act. Acad. Nat. Cur. iv. 224. O. sylvaticus, Roem. & Schult. Syst. ii. 481; Kunth, Rév. Gram. i. 44, and Enum. i. 139, Suppl. 101. O. pratensis, Schult. Mant. ii. 597. O. Jacquinii, Kunth, Rév. Gram. i. 44, and Enum. i. 140. O. lanceolatus, Kunth, ll. cc. 45, 146. O. decompositus, Nees in Endl. Prodr. Fl. Norfolk. 19. O. africanus; Wood, Natal Pl. t. 165; Eyles in Trans. Roy. Soc. S. Afr. v. 302, partly; not of Beauv. Panicum compositum, Linn. Sp. Pl. ed. i. 57; Trin. Gram. Ic. et Descr. t. 187, 189; Pan. Gen. 123, and in Mém. Acad. Sc. Pétersb. 6me sér. iii. 211; Steud. Syn. Pl. Glum. i. 44; Benth. Fl. Hongk. 411; Baker, Fl. Maurit. 439, partly. P. elatius, Linn. f. Suppl. 107. P. aristatum, Retz. Obs. iv. 17. P. lanceolatum, Retz. Obs. v. 17; Roxb. Fl. Ind. i. 297; Steud. l.c. 48. P. sylvaticum, Lam. Encycl. iv. 733; Trin. Gram. Ic. et Descr. t. 190, fig. A, and in Pan. Gen. 123, and in Mém. Acad. Sc. St. Pétersb. 6me sér. iii. 212 (vars. α , β , δ); Steud. l.c. 45. P. composito proximum, Rottl. in Gesellsch. Naturf. Freund. Neue Schr. iv. (1804) 224. P. peninsulanum, P. certificandum, P. longeracemosum, P. undatum, P. bidentulum, Steud. Syn. Pl. Glum. i. 44, 45. Andropogon undatus, Jacq. Coll. iii. 237, and Ic. Pl. Rar. iii. t. 631. Orthopogon compositus, R. Br. Prodr. 194; Miq. Fl. Ind. Bat. iii. 443. O. remotus, Trin. Fund. Agrost. 181. O. pratensis, Spreng. Syst. i. 306. O. Junghuhnii, O. longeracemosus, O. sylvaticus, Miq. l.c. Echinochloa lanceolata, Roem. & Schult, l.c. 476.

Nile Land. Eritrea: Amasen; Dongello, near Ghinda, Pappi, 4536; along the Fil-Fil torrent, Pappi, 5426; on mount Faghenat, 6500-8200 ft., Pappi, 5326. Socotra: forming turf along streams in Wadi Digal, 1900 ft., Schweinfurth, 587! British East Africa: bush near Lincoru, 7000 ft., Dummer, 1640!

Mozambique Distr. Zanzibar Island, Last! German East Africa: Usambara, in virgin forest near Lutindi, Holst, 3279! Nyasaland: Namasi, Cameron!

Portuguese East Africa: in damp woods near Shupanga, Kirk!

Also in Madagascar and the Mascarenes and widely distributed throughout tropical and subtropical Asia, Australia and Polynesia. Here too, as in O. hirtellus, a wide range of variation, apparently of the same character, is noticeable, although it does not seem to lead to cases of such extreme reduction, nor to the appearance of regionally prevailing or exclusive forms.

3. O. Burmannii, P. Beauv. Agrost. 54. Annual, up to 1\frac{1}{2} ft. high. Culms very slender, ascending from a long decumbent or rambling branched and rooting base, the internodes of which are often strongly compressed or at least very compressible, simple or more often branched upwards with the branches short and barren or flowering, glabrous or more or less hairy, often along a line adaxial to the supporting leaf. Leaf-sheaths somewhat loose, prominently striate, ciliate along the margins and pubescent at the nodes, otherwise glabrous or more or less spreadingly hairy, short or long; ligules very short, truncate, ciliate; blades lanceolate from a distinctly constricted and slightly rounded base, acutely acuminate, 3-2 in. by 2-6 lin., flat, thin and soft, dull pale green, loosely to very sparingly beset with fine rather long white hairs, not rough, margins slightly scaberulous upwards, midrib very slender, primary lateral nerves 2-3 on each side, but generally hardly differentiated from the secondary nerves, transverse veins very short and often obscure. Inflorescence more or less secund, of 3-8 very dense pale spike-like racemes on a flexuous slender semiterete or upwards triquetrous glabrous or finely pubescent axis 1-3 in. long, sometimes softly ciliate along its lateral angles; lower racemes distant by more than their own length $(\frac{1}{2}-1 \text{ in.})$, erect or oblique, linear, the longest rarely over \(\frac{2}{3}\) in. long, the upper or all often much shorter; rhachis usually terminated by a spikelet, straight, triquetrous, dorsally flat, pale green, fringed with fine almost silky hairs, internodes $\frac{1}{3}$ lin. long; pedicels 2-nate or solitary, reduced to very short truncate stumps, or up to ½ lin. long, with long hairs like the cilia of the rhachis. Spikelets contiguous, oblong-lanceolate, rarely much over 1 lin. long, pale green, one of a pair often imperfect. Glumes subequal (the upper slightly longer), $\frac{3}{4}$ lin. long, thinly membranous to subhyaline, oblong in profile, with pale capillary slightly rough awns 4-1 lin. long from a minute notch, ciliate and more or less (sometimes very sparingly) pubescent, the lower narrower, sub-3-nerved, upper 5-7-nerved with faint side-nerves. Lower floret barren: valve lanceolate-oblong in profile, acuminate, produced into a fine very short capillary awn, 7-nerved, ciliate upwards and finely pubescent above the middle; valvule 0. Upper floret \(\noting\), oblong, acute, 1 lin.





long or almost so, brownish, polished; valve and valvule papery, the former faintly 7-nerved. Anthers \frac{1}{2} lin. long. Stigmas moderately long, red. Grain lanceolate-oblong, almost 1 lin. long, convex on the back, almost flat on the face, with a narrow oblong hilum almost half the length of the grain.—Roem. & Schult. Syst. ii. 482; Kunth, Rév. Gram.i. 44, and Enum. i. 139, Suppl. 101; Trin. Ic. et Descr. Gram. t. 193; Franch. & Savat. Enum. Pl. Jap. ii. 160; Duthie, List Grass. N.-W. Ind. 8, Ill. Indig. Fodd. Grass. t. 47, and Fodd. Grass. N. Ind. 13; Durand & Schinz, Consp. Fl. Afr. v. 771; Franch. Contr. Fl. Congo Franc. in Bull. Soc. Hist. Nat. Autun, viii. 362 (reprint 50); Balf. f. Bot. Socotra, 312; Hook. f. Fl. Brit. Ind. vii. 68, and in Trim. Handb. Fl. Ceyl. v. 169; Cheval. Sudania, 90, and Études Fl. Afr. Centr. Franç. i. 366. O. Burmannii, var. albidulum, N. E. Br. in Gard. Chron. 1886, xxvi. 776. O. albus, Roem. & Schult. Syst. ii. 890. O. bromoides, P. Beauv. l.c. O. humboldtianus, Nees, Agrost. Bras. 264; Kunth, Enum. i. 140. O. cristatus, Presl, Rel. Haenk. i. 323; Kunth, l.c. 141; Hitchcock in Contr. U.S. Nat. Herb. xvii. 255. O. affinis, Presl, I.c. O. Preslei, Kunth, I.c. O. indicus, Duthie, List Grass. N.-W. Ind. 8; not of Roem. & Schult. O. africanus, Rendle in Cat. Afr. Pl. Welw. ii. 184; Chase in Proc. Biol. Soc. Washington, xxiv. 152, fig. 15. Panicum Burmanni, Retz. Obs. iii. 10; Roxb. Fl. Ind. i. 298; Trin. Pan. Gen. 121, and in Mém. Acad. Sc. St. Pétersb. 6me sér. iii. 209; Steud. Syn. Pl. Glum. i. 44; Baker, Fl. Maurit. 438; Doell in Mart. Fl. Bras. ii. ii. 148. P. bromoides, Lam. Ill. i. 170, and Encycl. iv. 732. P. hirtellum, N. L. Burm. Fl. Ind. t. 12, fig. 1; Host, Gram. Austr. iii. t. 52; not of Linn. P. multisetum, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 377. P. japonicum, Steud. in Flora, 1846, 18. Orthopogon albus, Nees ex Steud. Syn. Pl. Glum. i. 44; Miq. Fl. Ind. Bat. iii. 442. O. Burmanni, Miq. l.c.

Upper Guinea. Cape Verd Islands: S. Antao; ribeira da Torre, Lowe! St. Nicolai, Bolle! S. Vincent; Monte Verde, Lowe! Senegambia: without precise locality, Heudelot, 590! Sierra Leone: Mamaha, Thomas, 4414: Bumbuna, 650 ft., Thomas, 3343! Ronietta, 250 ft., Thomas, 5292! French Guinea: around Kouria, Chevalier, 14924! Southern Nigeria: Lagos, MacGregor, 100! Ndoni Town, Barter, 1767! and without precise locality, Thomas, 1753! Cameroons: Yaunde, Zenker & Staudt, 515! Fernando Po: in swampy places,

Cameroons: Yaunde, Zenker & Staudt, 515! Fernando Po: in swampy places, Vogel, 212! in open woods, Vogel, 246! Ansell!

North Central. Upper Oubangui; Krebedje; Fort Sibut, Chevalier, 6067! between Krebedje and Mpokou poste, Chevalier, 6068!

Nile Land. Jur: Abu Gurun's Seriba, Schweinfurth, 177! Abyssinia: by the Tacaze near Jelajeranne, Schimper, 1469! Socotra; south of Tamarid, Schweinfurth, 422! Balfour, 295!

Lower Guinea. Island of S. Thomas; Mount Cafe, Guegue, 2500 ft., Moller, 140! Gaboon: without precise locality, Thollon! Belgian Congo: Stanley Pool Distr.; Mokaba, Vanderyst, 3697! 3780! Angola: Golungo Alto; in grassy wooded places near Cungulungulo, Welwitsch, 7020! Mount Queta, by the Cuango river, Welwitsch, 7252! in maize fields near Sange. Welwitsch, 3003! the Cuango river, Welwitsch, 7252! in maize fields near Sange, Welwitsch, 3003! Huilla; in shady woods by the Monino river, Welwitsch, 2696!

Mozambique Distr. Lake Nyasa, Simons!

Widely distributed throughout the tropics of both hemispheres.

70. PANICUM, Linn.

Spikelets lanceolate to oblong, elliptic or orbicular in outline, symmetrical in profile, rarely somewhat oblique, falling entire or almost so, from the often elongated pedicels of a compound or decompound panicle, without a definite orientation towards the axis; lower floret of or barren, and then usually with a distinct valvule; upper floret \(\). Glumes more or less herbaceous-membranous; the lower usually shorter than the upper (often by very much), rarely equalling it, usually with 1 or more nerves or if very small nerveless; upper as long as the spikelet, rounded on the back, 5-9-nerved. Lower floret: valve very similar to the upper glume and equally rounded and curved on the back (rarely less when the spikelets become oblique), 5-9-, rarely 3- or 11-nerved; valvule thinly membranous to subhyaline, subequal to the valve or more or less reduced, rarely suppressed. Upper floret: valve subcoriaceous to coriaceous with firm margins, obtuse to subacute, emucronate (see 1, P. meyerianum), faintly nerved; valvule subequal to the valve and of similar substance, tightly embraced by the more or less involute margins of the valve. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted near the tip of the floret. Grain tightly enclosed by the hardened valve and valvule, dorsally compressed, biconvex to almost plano-convex; scutellum elliptic to ovateelliptic, about half as long as the grain; hilum subbasal, punctiform. -Perennial or annual, rarely suffrutescent, of varying habit and size; leaf-blades mostly linear to linear-lanceolate, but in some groups ovate or filiform to subulate; panicles usually much divided and at least temporarily open; spikelets usually loosely scattered, glabrous or hairy.

Species about 400, in the tropical and subtropical regions of both hemispheres, few in the warm-temperate regions.

The sections adopted here are mainly based on the Old World and especially the African material. They appear to represent on the whole homogeneous groups, held together by a number of correlated characters which suggest genetic affinity; only one or two of the smaller groups are somewhat unsatisfactory in this respect and may require revision when more material comes to hand.

KEY TO THE SECTIONS.

Spikelets symmetrical in profile (see § Monticolæ); leaves not soft and at the same time very thin and ovatelanceolate to ovate from a rounded and much constricted base.

*Valve of lower floret more than 3-nerved. +Blades typically much more than $\frac{1}{2}$ - $1\frac{1}{2}$ in. long or, if

not, then subulate-involute and pungent. ‡Spikelets over 1½ lin. long or if smaller then different from those of § *Monticolæ* (see below) and on plants of different habit. A. V. Vatter and the second to the second to

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§Glumes entire.

Fertile valve very minutely mucronate, like the valvule finely transversely rugose; spikelets shortly pedicelled and subsecund on short secondary or lower down in the panicle tertiary branchlets rather crowded, $\overline{1}_{2}^{1}$ lin. long, glaucous green; lower glume minute, nerveless or faintly 1-nerved, upper glume and lower valve finely 5-nerved; dorsally flattened; perennial

Fertile valve emucronate; spikelets differently arranged.

Spikelets more or less obtuse to shortly acute and plump, not gaping.

Spikelets oblong, $1\frac{1}{4}-2\frac{1}{2}$ lin. long; fertile glumes quite smooth.

C Axes of the inflorescence and sometimes also the culms with clavellatetipped hairs; spikelets $1\frac{1}{2}-2\frac{1}{2}$ lin. long; glumes and lower valve subherbaceous; lower usually $\frac{2}{3}$ the length of the spikelet or almost equalling it, rarely shorter and then conspicuously truncate and 9-11nerved; upper glume and lower valve 5-11-nerved; perennial ... II. CLAVEL-

I. Eriochloideæ.

LIGERÆ.

CC Axes of the inflorescence glabrous or if hairy the hairs not gland-tipped; spikelets $1\frac{1}{4}$ —2 lin. long, glabrous; glumes and lower valve subherbaceous; lower very small, rarely the length of the spikelet, very thin to hyaline, nerveless or 1-3nerved, rounded or subacute, upper glume and lower valve 5- (rarely 7-) nerved, nerves usually very slender

(see 7, P. infestum); perennial ... III. MAXIMÆ.

Spikelets broad-elliptic in outline to subglobose, ½—1 (mostly ¾) lin. long, breaking up; fertile glumes warty (see also 88, P. heterostachyum, § Ovalifoliae); glumes and lower valve herbaceous - membranous, green or variegated with yellow or suffused with purple, frequently with a bronzy lustre; lower glume $\frac{1}{2}$ to over $\frac{3}{4}$ the length of the spikelet or equal to it, 3-nerved; upper glume and lower valve 5-nerved; valve and valvule of fertile floret with few to many wart-like obliquely globose ovoid club- or spindleshaped trichomes, attached to the epidermis by a minute circular base and appressed to it, pointing forwards, one-celled or frequently with 1, rarely 2, apical cells; perennial or annual

... IV. VERRUCULOSÆ.

 \mathscr{A} Spikelets acuminate or distinctly acute or apiculate, usually not plump (turgid in $\S Durx$).

Spikelets much gaping early and permanently, 1-2 (rarely under 1) lin. long; glumes and lower valve more or less acuminate and often mucronulate or mucronate, finely keeled upwards with frequently slightly recurved tips, rather dry, pale or tinged with purple or quite purple; lower glume ½ the length of the upper glume, this like the lower valve 5-9-nerved, false fruit white or yellowish or bluish white, rarely honey-coloured; perennial or annual

V. HIANTES.

Spikelets not conspicuously and permanently gaping or only when mature; upper glume and lower valve with straight or slightly incurved tips.

Spikelets mostly very loosely scattered on long pedicels or, if paired, on long fine branchlets, subulate-acuminate to acute, 1–3 (mostly over 1½) lin. long, pale green, frequently tinged with purple; lower glume ½ to \$ the length of the spikelet; upper glume like the lower valve 7–11- (rarely 5-) nerved; false fruits at length brownish to almost black ...

VI. MILIACEÆ.

Spikelets more approximate on shorter pedicels, subobtuse, subacute or apiculate, rarely shortly subulate-acuminate; pedicels (particularly the lateral) from less than 1 to 2 lin. long; false fruits whitish or yellowish.

Lower glume as long as or almost as long as the upper, 7-9-nerved; suffrutescent with downwards woody culms and hard pungent leaf-blades, the latter often much reduced

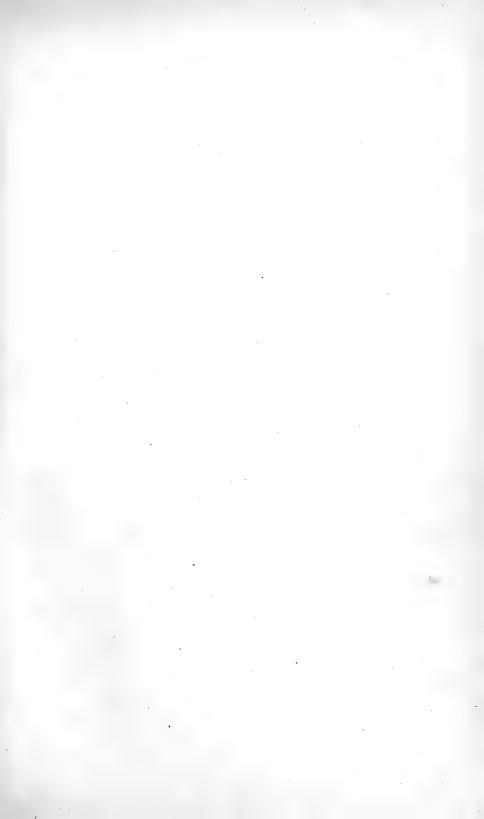
VII. DURÆ.

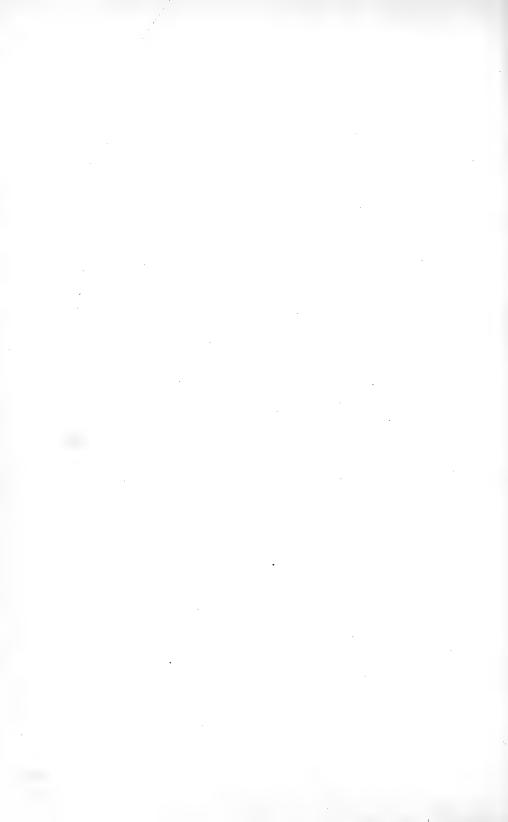
Lower glume very small to up to $\frac{1}{2}$ the length of the spikelet, few- or imperfectly nerved.

Erect or procumbent cæspitose perennials usually with long more or less wiry stolons or runners, barren shoots often distichously leafy; leaf-blades firm to hard, often convolute to subulate or aciculiform; spikelets pale

.. VIII. REPENTES.

Erect perennials without long stolons (short stolons in 68, P. coloratum) or runners, or annuals; leaf-blades flat, usually long to





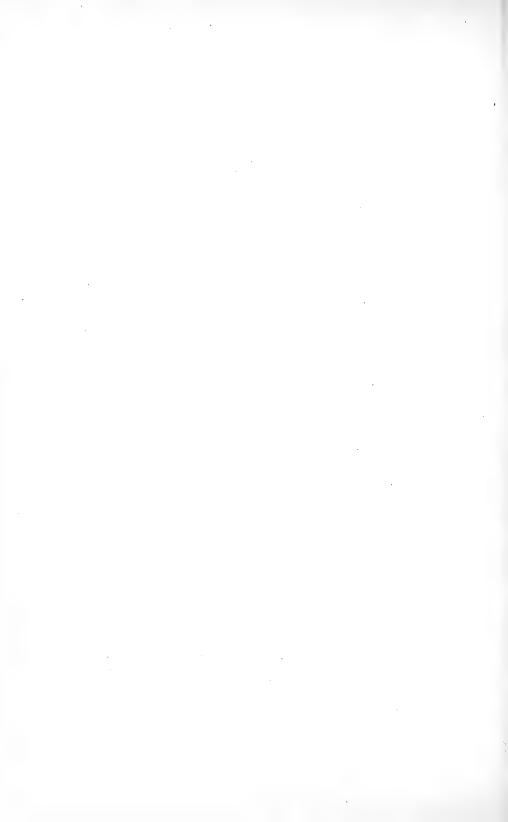
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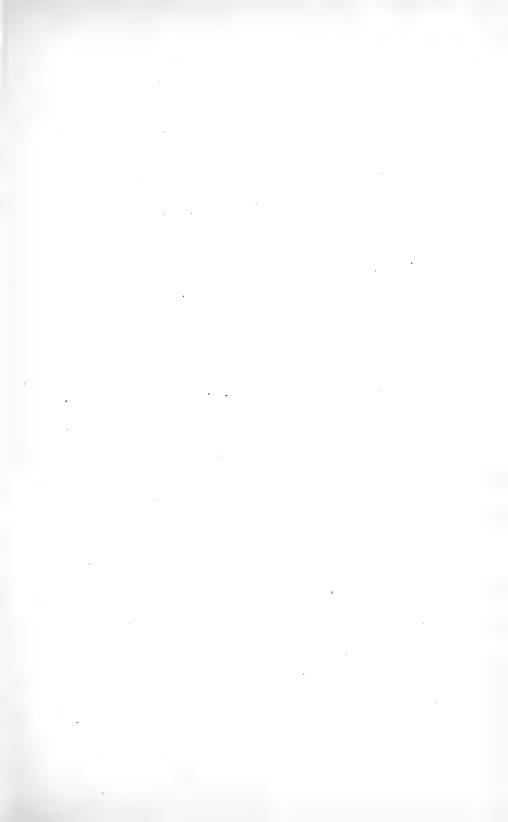
i dividume.] Chvii. Graniner (Scapi).	0.41
very long, rarely convolute; spikelets pale green, or vividly variegated or uniformly tinged with dark purple	
§ § Glumes pectinately toothed; spikelets oblong, \$\frac{4}{2}\$-2 lin. long, on very fine flexuous pedicels, in open or somewhat contracted and loose	
panicles; perennial	X. PECTINATÆ.
noded culms and frequently sharply reflexed linear to linear-lanceolate distinctly acuminate leaf-blades	VI Morros
††Leaf-blades ½ ¾ in. by less than 1-2½ lin., linear-oblong to ovate-lanceolate; spikelets ¾-1 lin. long, oblong to ellipsoid in small panieles, ½-1 in. long with rigid horizontally spreading or ascending branches; loosely tufted annuals or perennials, the latter	XI. MONTICOLÆ.
**Lower valve 3-nerved; spikelets 1-1½ lin. long, variously shaped, pubescent to villous, in delicate open panicles with the lowest branches pseudo-verticillate; lowest glume hyaline to subhyaline, less or much less than half the length of the spikelet, faintly 1-nerved; upper glume faintly 5-nerved (finely caudate-acuminate in 83, P. caudiglume); annual or perennial with linear-lanceolate leaf-blades	XIII. TRINERVES.
Spikelets slightly oblique to gibbous in profile, ½-1 lin. long, loosely scattered in delicate rigidly open panicles; lower glume mostly 3-nerved, half as long to as long as the spikelet, in the latter case narrower than the lower valve to which it is appressed; upper glume and lower valve 5-nerved; weak loosely tufted annuals with thin soft ovate or ovate-lanceolate leaf-blades	
which are suddenly constricted and much rounded at the base	XIV. OVALIFOLIÆ.
I. Eriochloideæ.	
Only species	1. P. meyerianum.
II. CLAVELLIGERÆ.	
Spikelets 2-2½ lin. long, turgid in large somewhat coarse panicles (up to 1 ft. by 6-7 in.) with all or most of the ultimate divisions more or less contracted on the primary branches; glumes and lower valve 5-7-nerved, ovate, subacute to obtuse but not truncate, a robust grass	
FL. TROP. AFR. VOL. IX —PT. 4	2 m

FL. TROP. AFR. VOL. IX.—PT. 4.

Spikelets 1½-2 lin. long, in smaller panicles 2-4 in. by 1½-3 in.; upper glume and lower valve 9-11-nerved. Lower glume acute, 5-nerved; spikelets under 2 lin. long. Panicle somewhat stiff with the rather short pedicels	
mostly contracted on the branchlets 3. P. lineatum.	
Panicle flexuous, very loose and delicately branched with many of the pedicels long (up to 5 lin.), very flexuous and spreading 4. P. adenophorum	ъ.
Lower glume truncate, 9-nerved; paniele very loose; spikelets 2 lin. long 5. P. flacciflorum.	
Sie F. Calaurane. 111. MAXIME. 1.73.	
Fertile valve and valvule finely transversely rugose; panicles large, floribund; blades long (up to $l\frac{1}{2}$ or even 2 ft.).	
Lower secondary and tertiary divisions of the panicle usually elongated (the former up to 3 in.) and more or less spreading, hence the spikelets more or less scattered; lower valve rounded on the back, faintly nerved 6. P. maximum.	
Secondary and tertiary divisions of the panicle very short, the spikelets in long spiciform racemes on a common axis; lower valve depressed on the back with the midnerve usually sunk in a groove 7. P. infestum.	
Fertile valve and valvule quite smooth, polished; panicles from a few to 6 in. long. Culms rather firm to almost woody, many-noded, more or less anfractuous, rambling or climbing; blades linear-lanceolate to lanceolate, $l\frac{1}{2}$ -6 in. by 3-7 lin. Axis of panicle and peduncle with long very fine spreading hairs; spikelets obtuse to subobtuse; lower glume minute, nerveless; lower floret 3 8. P. trichocladum	•
Axis of panicle and peduncle glabrous; spikelets acute; lower glume $\frac{1}{4}$ of the spikelet, 1-nerved; lower floret barren with a rudimentary valvule 9. P. transvenulo sum	
Culms stout, very spongy; blades very narrow, up to 1 ft. by 1½ lin., more or less spongy; upper glume 7-, lower 9-nerved 10. P. spongiosum.	
TV V	
IV. VERRUCULOSÆ. Perennial. Leaf-blades setaceously convolute or if unrolled not much over 1 lin. wide, never keeled; compactly cæspitose grasses with 1–2-noded culms, nodes faintly marked. Short grasses, up to 1 ft. high with small panicles (1–3 in.).	
Spikelets quite glabrous, about \(\frac{5}{8} \) lin. long, more or	
less acute or apiculate; compactly caspitose, with persistent coats of pale firm sheath-bases,	
blades finely setaceous 11. P. brazza- villense	
Spikelets pubescent, \(\frac{3}{4}\) lin. long, more or less obtuse; more loosely cæspitose with few brown or purplish and loose basal sheaths, blades coarser 12. P. ianthum.	







Minne La Stopp [plo42-bay] of girons Parison (1)

P. hetafarence of une 2000
eight of nather land had her waster of 21 mins

de 1: le 1 same in free à back tobe deuxe

prince ou 10 (dans la subset minde grenze),

efulleto de 17-2 min, à gliernes égalant prieque

l'o pillet, à que de de la pieur suplimine et

pair arris con verragaeux, met in Stapp

Taller coarser grasses with longer panicles (5–8 in.). Spikelets pubescent, up to \(^3_4\) lin. long \(\ldots\) \(\ldots\)	13.	P. Frederici.
Spikelets glabrous, about I lin. long	14.	P. juncifolium.
Leaf-blades not setaceously convolute or if convolute then much over 1 lin. wide when unrolled; loosely or scantily tufted grasses with mostly many-noded culms.		
Culms erect, stiff or only slightly geniculate, somewhat		
robust; leaf-blades 4 to over 12 in. by $1\frac{1}{2}$ — $4\frac{1}{2}$ lin. Culms about 6-noded; blades of lower leaves long-		
narrowed towards the base with recurved margins and a dorsally much projecting midrib		P. carinifolium.
Culms frequently more than 6- (up to 12-) noded; blades flat or somewhat involute, not or only slightly narrowed towards the base, with a slender midrib.		
Blades stiff, erect, glabrous except for some long cilia near the base; sheaths eciliate; spikelets almost 1 lin. long, rather obtuse, dull; lower		
glume $\frac{4}{5}$ the length of the spikelet or almost as long	16.	P. strictissimum.
Blades spreading or reflexed, usually hairy at the		
base above the ligule; sheaths ciliate; spikelets 1-1; lin. long, shortly acute with		
strong metallic lustre; lower glume about	17.	P. præaltum.
Culms slender to very slender, weak and usually		
geniculately ascending; leaf-blades narrow (1–2 lin.) and usually much under 6 in. long. Spikelets over 1 lin. long, very plump, in slightly subsecund and sometimes nodding panicles,		
quite glabrous; culms sparingly branched:	18.	$P.\ subrepandum.$
Spikelets under 1 lin. long; panicles erect, quaquaversal, usually stiff; blades 2-4 in. by $1-1\frac{1}{2}$ lin.		- · · · · · · · · · · · · · · · · · · ·
Panicles distinctly and usually long-exserted; spikelets roundish in outline to almost		
orbicular.		
Spikelets quite glabrous with a conspicuous bronze lustre, almost globose; lower		
glume $\frac{1}{2}$ the length of the spikelets; culms simple or sparingly branched below	19.	P. fulgens.
Spikelets pubescent, very rarely glabrous, dull		_ · · · · · · · · · · · · · · · · · · ·
without a metallic lustre. Culms simple or sparingly branched below; blades spreading, flat, flaccid	20.	P. nervatum.
Culms much branched below, the branches		
in erect leafy fascicles; blades subcrect, flat or convolute, rigid, running out into		
a long subulate point	21.	P. pubiglume.
Panicles shortly or laterally exserted and often equalled or overtopped by the uppermost blade; spikelets ovate to lanceolate-oblong,		
acute, glabrous, with a faint metallic lustre; culms simple or sparingly branched below;		
blades obliquely erect, frequently convolute,	22	P. plagianthum.
sugary rigid, quite sinoon	<i>-4.</i>	r · puy winnant.

	-
Annual. Culms slender but not finely filiform; blades 1-5 in. by 1-4½ lin.; fertile floret distinctly verrucose.	
Panicles open and loose with the ultimate divisions more or less spreading; pedicels 1-4 lin. long. Spikelets ovate to elliptic-oblong, quite glabrous;	
blades $2\frac{1}{2}$ — $4\frac{1}{2}$ lin. wide. Culms leafy up to the panicle, somewhat wiry; blades firm, drying dark, very closely and	23. P. sublætum.
Culms leafy mostly below the middle, rather weak; panicles long-exserted; blades soft to flaccid, drying bright green or yellow, up to 3 in. by 1½-2 lin., more loosely nerved	
Spikelets broad- or rotundate-elliptic, hairy; blades $1-1\frac{1}{2}$ lin. wide. Spikelets with short and often scanty hairs	25. P. lindleyanum.
Spikelets densely covered with long spreading	
Panicles more or less open, but with the ultimate divisions contracted along the primary branches; pedicels 1-2 lin. long	27. P. vicini-
Culms finely filiform; blades up to $\frac{3}{4}$ in. by $\frac{3}{4}$ lin.; spikelets ovate, acute, variegated, glabrous or sparingly pubescent; fertile floret almost smooth	florum. 28. P. filicaule.
V. Hiantes.	
Perennial. Upper glume and lower valve 7–9-nerved. Panicle large, decompound, often 1 ft. long or longer; culms simple, more or less stout, sometimes reed- like.	
Spikelets 1 lin. long; upper glume narrow, long mucronate-acuminate, much exceeding the lower floret; panicle hirsute below; leaf-blades 1 ft. by $3\frac{1}{2}-4\frac{1}{2}$ lin Spikelets 1–2 lin. long.	29. P. Hanningtonii.
Spikelets 1½ lin. long, slender, oblong-lanceolate; a more or less reed-like grass with long wide blades (1-2 ft. by 5-10 lin.)	30. P. phragmi- toides.
Spikelets $1\frac{1}{2}$ —2 lin. long, somewhat turgid, ovate- oblong or ovate-lanceolate; blades 6–9 in. by 2–3 lin	31. P. anabaptis- tum.
Panicle much smaller and less divided, 3–7 in. long. Culms fastigiately branched above the simple base, lower internodes elongated, 'glaucous, more or less woody; spikelets 13–2 lin. long; glumes finely mucronate-acuminate	32. P. Ruspolii.
Culms simple or nearly so, geniculately ascending; spikelets $1\frac{1}{4}-1\frac{1}{2}$ lin. long; acumen of upper glume laterally compressed, beaked.	
Culms 5-9-noded, wiry below, glabrous; internodes exserted or bared by the slipping off or the decay of the sheath; spikelets up to	99 7
1½ lin. long, yellowish-green	33. P. massaiense.

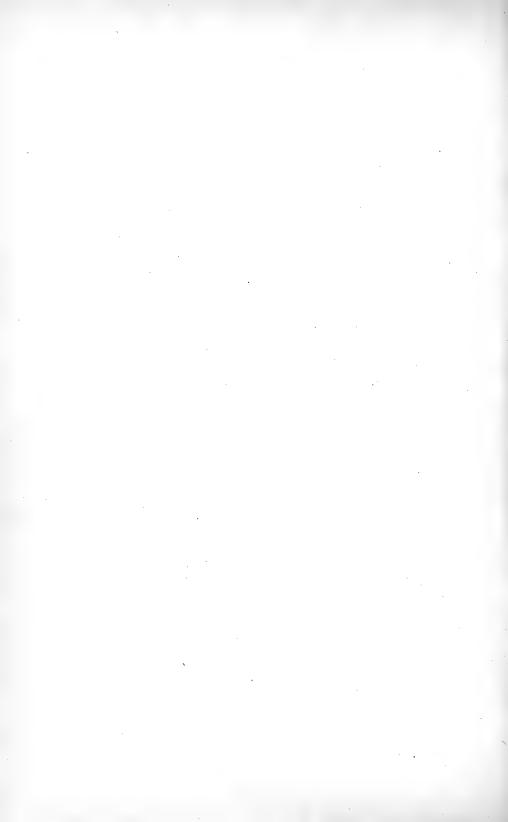
AP. 9.

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Culms 3-noded, soft, hirsute, internodes shortly exserted except the uppermost; spikelets up to over $1\frac{1}{2}$ lin. long, dull green with purple or altogether dark purple	34.	P. powoides.
Upper glume and lower valve 5-nerved or the former		
7-nerved.		
Spikelets $\frac{7}{8}$ lin. long, somewhat turgid, in narrow contracted often interrupted panieles	35.	P. graniflorum.
Spikelets $1-1\frac{1}{2}$ lin. long, not turgid, nor the panicles		2 · g · ·····
as in P. graniflorum.		
Compactly cospitose, the slender culms densely coated with the firm persistent leaf-bases; leaf-		
blades narrow, flat or setaceously convolute,		
flattened out $1-2\frac{1}{2}$ lin. wide. Panicles open, up to $1\frac{1}{2}$ in. wide, delicate, very		
loose and somewhat stiff, often with ex-		
tremely fine long hairs downwards; spikelets		
widely and obliquely gaping, 3-1 lin. long; blades setaceously convolute, up to 1 lin.		
wide (flat)	36.	P. congoënse.
Panicles open, 2-4 in. wide, glabrous; spikelets usually less and not so obliquely gaping,		
$1-1\frac{1}{2}$ lin. long; blades $1-2\frac{1}{2}$ lin. wide (flat).		
Spikelets 1 lin. long; panicle very loose, divisions very fine; blades often flat;		
culms $\frac{1}{2}$ $\frac{3}{4}$ lin. diam.		
Whole plant glabrous; culms 4-noded;	97	D
leaf-blades flat Whole plant more or less hairy, except the	51.	P. vagiflorum.
panicle; culms 1-noded; leaf-blades		
flat or setaceously convolute upwards	38.	P. pæcilanthum.
Spikelets mostly 1½ lin. long; panicle less loose, divisions less fine and stiffer; lowest		
sheaths tomentose at the base; blades		
flat or setaceously convolute, firm and more or less rigid; culms 1-2-noded, up to		
I lin. diam	39.	P. dregeanum.
Not compactly exspitose nor with a dense coat of		
persistent sheath-bases. Panicle with long spreading hairs from all axes;		
glumes long-mucronate	40.	P. Pilgeri.
Panicle glabrous.		
Culms simple, reed-like, stout, 4–6 ft. high, 4–6-noded; blades $\frac{1}{2}$ – $1\frac{1}{2}$ ft. by 2–5 lin.;		
panicle $\frac{1}{2}$ to over 1 ft. by 2–5 in.; upper	41	D amhama
glume faintly 5-nerved	41.	neurum.
Culms slender, more or less branched; upper		
glume usually 7-nerved. Culms sparingly branched; panicle con-		
tracted, narrow, $6-2$ in. by $1-2$ in.; spike-		
lets up to almost $1\frac{1}{2}$ lin. long; blades $1-2$ lin. wide.		
Culms up to 9-noded; blades up to over		
I ft.; lower glume distinctly 5-nerved, $\frac{1}{2}$ — $\frac{2}{3}$ the length of the lower floret	42	P Rowlandii
Culms 4-noded; blades 4-8 in.; lower	Ξω.	. 2 . 100000000000
glume with obscure side-nerves, $\frac{2}{3} - \frac{3}{4}$	40	D 4
the length of the lower floret	43.	P. fluviicola.

Culms 4-5-noded, branched all along, the branches often fascicled; lower internodes wiry; blades 3-6 in. by 2-2½ lin.; panicle very loose and open, about 6 in. by 2-5 in.; spikelets 1 lin. long; lower glume 5-nerved	44.	<i>P</i> .	genuflexu m.	.5 C-
Spikelets hairy; whole plant including the panicle finely hirsute; lower glume 5-nerved	45.	P.		, , , ,
Spikelets glabrous; lower glume 3-1-nerved. Spikelets to 1½ lin. long; lateral pedicels 3-6 or 9 lin. long; culms branched upwards with the panicles mostly in tiers (see p. 210). Culms undivided for a short distance (1 or 2 internodes), sheaths not deciduous; panicles up to				
over 1 ft. long; pedicels 3-6 or occasionally	4.0		. 7	
,	46.	Ρ.	paucinode.	
Culms undivided at the base for half their length (about 8 internodes), with the stem-nodes enclosed in the cuff-like persistent bases of the deciduous sheath; panicles about 3 in long;				
pedicels from very short to up to 4 lin. long	47.	P.	manicatum.	
Spikelets up to 1 lin. long; lateral pedicels 1-3 lin. long; culms 2-4-noded; panicles 3-5 in. long. Spikelets more or less but not very widely gaping; divisions of the primary branches at length mostly contracted; spikelets 1 lin. long; lower				
glume not or very obscurely mucronate; lower	48.	P.	humile.	
Spikelets widely and often obliquely gaping; all the divisions of the panicle divaricate; spikelets hardly I lin. long; lower glume distinctly		_		
mucronate or aristulate; lower floret 3	49.	Ρ.	Afzelii.	
VI. MILIACEÆ.				
Panicles much divided; blades flat, $1\frac{1}{2}$ -10 lin. wide. Spikelets $2\frac{1}{2}$ -3 lin. long, in more or less nodding and contracted panicles; lower glume 7-, upper 9-11-nerved.				
Spikelets 3 lin. long, deciduous; pedicels 4–8 lin. long; blades passing quite gradually into the sheath, $2\frac{1}{2}$ –5 lin. wide, with spinulose margins	50.	P.	callosum.	
Spikelets 2½ lin. long, with the glumes persistent on the pedicels, these very short to 3 lin. long; blades with a more or less rounded and often semi-amplexical base and scaberulous margins. A				
cultivated grass	51.	P.	miliaceum.	696
Spikelets 1–2 lin. long, in erect very loose panicles; lower glume 5-, upper 7–9-nerved.				
Spikelets 2 lin. long; primary branches of panicle up to 9 in., divided from 1-2 in. above the base with internodes $1\frac{1}{2}-1$ in. long, like all the divisions rather stiff; pedicels $2\frac{1}{2}-12$ lin. long		Р.	himpothrix.	
Control on 1 11 11 1	J=.		Provide	

Spikelets 1-1½ lin. long.

*Spikelets shortly pedicelled in pairs on long very slender branchlets or distant and mostly on long pedicels.

44a . De la fille



†Spikelets usually in pairs, contiguous and shortly pedicelled at the ends of long finely filiform sparingly divided more or less flexuous branches and their branchlets; panicles terminal, up to 20 in. long when mature, widely open; lower floret barren with a much reduced ovate or triangular valvule with obscure basal flaps.

Culms sheathed up to the panicle which emerges with a sheaf of branches from the uppermost sheath; its divisions finely filiform to capillary...

... 53. P. Kerstingii.

Culms exserted from the uppermost sheath with most of the leaves near the base; the divisions of the panicle never capillary ... 54. P. pansum.

††Spikelets usually distant often on long pedicels or relatively shorter and more numerous branchlets; panicles terminal and lateral, 2-6 in. long; lower floret barren with a valvule ½-½ the length of the valve and with distinct flaps.

Panicles just exserted from the supporting sheaths; upper glume and lower valve 9-nerved or the former 7-nerved.

Panicles 3-6 in. long, glabrous, equalled by the uppermost blades; longest blades up to 8 in. by 3-5 lin.; valvule of lower floret with almost contiguous flaps; mature false fruits pale olive-brown ... 55. P. laetum.

Panicles 2-3 in. long, finely hairy all over, much exceeding the upper blades; the longest blades up to 1 in. by 1½-2 lin.; valvule of lower floret with the flaps

a delicate grass 56. P. sociale.

Terminal panicles at length distinctly exserted,
lateral panicles few and mostly poorly
developed; grains dark brown to jet black.

reaching up to $\frac{2}{3}$ of the valve; mature false fruits dark chestnut-brown to black;

Upper glume and lower valve 9-nerved; flaps of valvule of lower floret very narrow upwards; blades almost glabrous excepting the tubercle-based hairs of the margins and the dorsal midrib, 3-8 in. by 3-6 lin.

Upper glume and lower valve 7-nerved or the former 5-nerved; flaps of valvule of lower floret broad all along, contiguous or almost so; blades usually hirsute on both sides apart from the margins and midrib, 1-4 in. by 2-4 lin. 58. P. atrosan-

... 57. P. novemnerve.

58. P. atrosanguineum.

**Spikelets mostly 2-nate from low down on the penultimate divisions of an open panicle (3-4 in. by 1-3 in.), with frequently curved branches; upper glume 7-, lower valve 9-nerved; lower floret barren with a slightly shorter narrow-flapped valvule

... 59. P. arcurameum.

\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Panicles reduced to 3-1 branches, bearing 4-1 spikelets 1½ lin. long; blades setaceously convolute, ¾ lin. across 60. P. haplocaulos
VII. Duræ.
Spikelets about 2 lin. long; glumes subequal, acutely acuminate in profile; panieles up to 6-9 in. long (lateral often much reduced), primary branches about half the length of the paniele 61. P. turgidum.
Spikelets under 2 lin. long; glumes unequal, lower \(^2\) the length of the spikelet, not or obscurely acuminate in profile; panicle not much over 1 in. long; primary branches \(^1\)\(^1
VIII. REPENTES.
Leaf-blades $2\frac{1}{2}$ -6 in. by $1\frac{1}{2}$ -3 lin., usually convolute; spikelets 1 - $1\frac{3}{8}$ lin. long, in more or less contracted panicles, 3-8 in. long; stoloniferous 63. P. repens.
Leaf-blades $\frac{1}{2}$ -2 in., more or less pungent; spikelets $\frac{3}{4}$ -1 lin.
Procumbent with stolons or runners. Stolons and runners stout, covered with tough persistent cataphylls and almost bladeless sheaths; blades of the short shoots very rigid, needleshaped; panicles very small, up to ½ in. long, hardly exserted from the leaf-tufts 64. P. pinifolium.
Runners and prostrate culm-bases slender, bared by the decay or the slipping off of the sheaths; blades of the short shoots tightly involute, but hardly needle-shaped; panicles up to 1½ in. long, very loose, exserted 65. P. rigidum.
Erect or obliquely ascending without stolons or runners; culms slender and very wiry, branched all along or simple towards the base; leaf-sheaths very firm and long-persistent; panicles up to 1½ in. long, closely contracted when mature, exserted 66. P. subflabellatum.
1 . A
IX. COLOBATÆ.
Spikelets 13-2 lin. long with a slender acumen, in large loose panieles (up to 1 ft. long) with the lateral pedicels short and the terminal up to 4 lin. long; lower floret 3 or barren; perennial 67. P. porphyror-
rhizos.
Spikelets 1-1½ lin. long; pedicels mostly 1-1½ lin. long. Grasses of dry land with somewhat plump often variegated subacute or shortly apiculate spikelets; lower floret &; ligules distinctly ciliate.
Perennial with short stolons 68. P. coloratum.
Annual 69. P. Schinzii.
Hygrophilous grasses with more or less acuminate spikelets $1\frac{1}{4}$ lin. long which are pale green, rarely uniformly suffused with purple. Annual; panicles 3-5 (rarely 6) in. long; penultimate

of P. Sickie 1: 1921

74° P. Lukwanguleuse

divisions of the panicle forming loosely 3-2spiculate racemes, contracted on their branchlets; ... 70. P. hygrocharis. lower floret &; ligules distinctly ciliate ... Perennial, with readily disintegrating rhizomes; panicles up to over 1 ft. long, abundantly divided; ligules a very short minutely ciliolate rim or sometimes obscure. Spikelets oblong when closed, somewhat plump, shortly and acutely acuminate, loosely arranged on the long slender branches of the panicle; ... 71. P. Swynnerlower floret 3 ... Spikelets lanceolate when closed, with a slender acute acumen, in short 3-2-spiculate racemes appressed to the branchlets bearing them, these again contracted on their mother branches which assume a whip-like appearance; lower floret barren, with or more often without a 72. P. longi- Licht valvule ... X. PECTINATÆ. Spikelets $1\frac{3}{4}$ –2 lin. long; lower glume with 3–4 nerves and as many teeth, $\frac{1}{3}$ – $\frac{1}{2}$ the length of the spikelet; lower ... 73. P. pectinatum. valve 7-nerved and minutely 3-toothed Spikelets $\frac{4}{5}$ -1 lin. long; lower glume 3-nerved and 3toothed, $\frac{1}{5}$ the length of the spikelet; lower valve with ... 74. P. pectinellum. 5-7 nerves and as many teeth 14 XI. Monticolæ. Lower glume very much shorter than the spikelet. Panicle more or less flexuous to flaccid, the divisions of the primary branches contracted. Spikelets with a tuft of fine long hairs from the acute tip of the upper glume, $1-1\frac{1}{4}$ lin. 75. P. acrotrichum. Spikelets glabrous, to over 1½ lin. long ... 76. P. monticolum. Panicle ultimately stiff, widely open and loose; spikelets ... 77. P. calvum. glabrous, 1½ lin. long Lower glume as long or almost as long as the spikelet. Spikelets lanceolate, slightly oblique in profile, in panicles up to 6 in. long; glumes quite equal and as long as the spikelet, faintly nerved; leaf-blades ... 78. P. subobliquum. 2–6 in. by 7–11 lin. Spikelets oblong to ovate-oblong, symmetrical in profile, in long-exserted widely open or sometimes contracted panicles 2-3 in. by 2 to over 3 in.; lower glume about $\frac{4}{5}$ the length of the spikelet, like the upper and the lower valve prominently nerved from 79. P. Hochstetteri. the base upwards; leaf-blades up to 3 in. by 2 lin. XII. Pusillæ.

Annual; culms very weak; blades soft; spikelets 1 lin. long; lower glume $\frac{4}{5}$ the length of the spikelet or

...

...

...

. . . .

•••

almost as long

O. See

... 80. P. pusillum.

thyrsum.

Perennial; culms filiform, wiry; blades rather rigid; spikelets $\frac{2}{3} - \frac{3}{4}$ lin. long; lower glume much shorter than the spikelet.		
Spikelets oblong, in divaricate panicles; lower glume not more than ½ the length of the spikelet; blades lanceolate to linear-oblong	81.	P. parvifolium.
Spikelets elliptic, in a contracted panicle with ascending branches; lower glume \(^3\)_the length of the spikelets; blades ovate to lanceolate \(\dots\) \(\dots\) \(\dots\)	82.	P. Beccabunga.

XIII. TRINERVES.

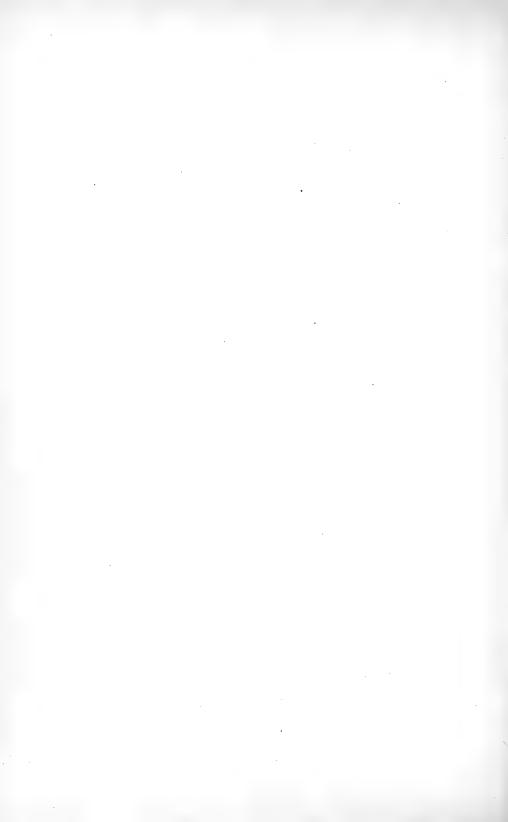
Up.	ber grame	produced :	nto an awniet	• • •	• • •	• • •	83.	P.	cauaigiume.	
Upj	per glume	acute.	use, finely tom	ontono on	rillona	0.11				
S	over;	lower glun	e rounded, ve	ry obtuse	···		84.	P.	tephro- santhos.	
S		lanceolate, ; lower glui	acuté, very lo ne acute	osely and			85.	P.	micro-	,

XIV. OVALIFOLIÆ.

Spikelets slightly oblique in profile.
Lower glume broad-ovate, up to ½ the length of the spikelet; spikelets ½ lin. long 86. P. trichoides.
Lower glume as long as the spikelet, lanceolate, narrower than the spikelet; spikelets \(\frac{3}{4} \) lin. long \(\ldots \). 87. \(P. \text{ brevifolium.} \(\gamma \) \(3 \) \)
Spikelets gibbous, particularly when young, 1 lin. long; fertile floret minutely granular-papillose; branching
pseudo-dichotomous 88. P. hetero- stachyum.

1. P. meyerianum, Nees, Fl. Afr. Austr. 32. Perennial, to over 3 ft. high, often apparently tall. Culms erect or ascending from a decumbent rooting base, simple or more often sparingly branched, stout, terete, glabrous, 5- to many-noded, sheathed all along or some of the upper nodes shortly exserted. Leaves more or less glaucous; sheaths tight, firm, glabrous except at the silkily pubescent or villous nodes or softly ciliate upwards with a delicately pubescent or villous transverse zone at the junction with the blade or loosely and softly hairy all along, with the hairs tubercle-based and deciduous; ligule reduced to a fine ciliate rim; blades linear-lanceolate from a rounded contracted base, long-tapering to a fine point, 3-8 in. by 3-7 lin., firm, somewhat succulent, glabrous, smooth except along the scaberulous margins, midrib of large leaves slightly prominent below and whitish above towards the base, otherwise very fine or indistinct like the lateral nerves. Panicle oblong to ovate-oblong, 3-6 in. long, contracted or opened out by the spreading of the lower branches and then up to 4 in. wide, divided to the third or sometimes the fourth degree, glabrous except the silkily pubescent or villosulous motile bases of the primary branches and some long fine hairs on the pedicels; primary axis slender, angular, scaberulous upwards;

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primary branches irregularly scattered or approximate in pairs, suberect or more or less spreading, the lowest up to 3-4 in. long, filiform, scaberulous, divided from low down or from the very base, the branchlets more or less secund, representing short dense downwards sometimes compound racemes; pedicels with discoid tips and usually with 1-3 fine long hairs below them, the lateral very short, the longer up to 1 lin. long. Spikelets rather crowded, ovate-oblong, acute to subacuminate, 1½ lin. long, glabrous, glaucous or sometimes tinged with purple. Glumes very different; lower minute, truncate or apiculate, hyaline, white or purple; upper membranous, oblong, acute to subacuminate, faintly 5-nerved, the tips or the back often purple. Lower floret usually 3; valve very similar to the upper glume and of equal size; valvule as long as the valve, oblong; anthers $\frac{1}{2}$ lin. long. Upper floret Σ , oblong, obtuse or minutely apiculate, ½ lin. long, dull, whitish, very finely pitted; valve and valvule thinly crustaceous.—Steud. Syn. Pl. Glum. i. 61; Durand & Schinz, Consp. Fl. Afr. v. 754; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 21; Stapf in Dyer, Fl. Cap. vii. 406. P. mite, Steud. l.c. 68; Durand & Schinz, I.c. 755. P. schimperianum, Hochst. ex A. - ~ Rich. Tent. Fl. Abyss. ii. 371; Steud. l.c. 68; Schweinf, Beitr. Fl. 72 Aethiop. 301.

Nile Land. Sudan: Egedh (between Berber and Khartum), Schweinfurth, 532! Cordofan; without precise locality, Kotschy, 442! Blue Nile; near Singa, Broun, 807! Zamarka, Broun, 042! Bahr el Gebel; near Bor, Broun, 019! Abyssinia: Shire, Quartin Dillon, and without precise locality, Schimper, 1853! British East Africa: in grassy plains and salt marshes near the shore at Nakonumbi, Gregory! Tana plains, near Ngatana, Gregory!

Also in Yemen and in Natal.

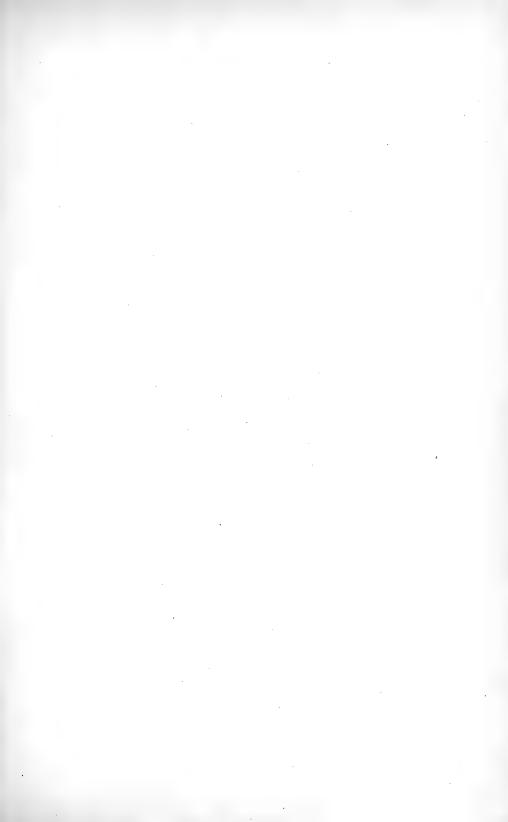
Panicum umbratile, Mez in Engl. Jahrb. xxxiv. 142, described from a specimen collected by Schimper in Abyssinia (no. 1554) apparently belongs to this species, although the author does not mention the characteristic minute mucro of the fertile floret. The position of P. meyerianum in Panicum is somewhat irregular. It may be considered as a connecting link between it and Eriochloa with which it has much in common; but the globose swelling of the basal internode of the spikelet of Eriochloa is only slightly indicated, and the first glume reduced in the latter genus to an obsolete rim is well developed although small.

2. P. deustum, Thunb. Prodr. i. 19. Perennial, up to 4 ft. high, tufted on a short rhizome covered with the appressedly hairy remainders of cataphylls; innovations intra- or extra-vaginal. Culms erect or geniculately ascending, slender or more or less stout (to 2 lin. diam.), up to 9-noded, simple or more or less branched, with the branches long and erect, terete, glabrous or more or less pubescent or hirsute below the nodes, sheathed almost all along or the upper internodes exserted. Leaves glabrous or sparingly (rarely densely) hirsute with tubercle-based hairs; sheaths rather firm, of strong branched specimens almost coriaceous, terete, striate, finely pubescent or quite glabrous at the nodes; ligule reduced to a narrow membranous ciliate rim; blades linear to lanceolate-linear from a

contracted and rounded or gradually narrowed base, long-tapering to a very fine point, $\frac{1}{2}$ -1 $\frac{1}{2}$ ft. by 4-9 (rarely 12) lin., flat, margins scabrid, midrib rather stout and prominent below, channelled and whitish above, primary nerves 5-7 on each side, fine, but distinct below. Panicle erect or slightly nodding, contracted, ultimately usually widely open, 3-9 in. long, divided to the third degree; axis slender, grooved below, upwards angular, scabrid, often pubescent or softly hirsute in the lower part, particularly towards the nodes, the hairs fine, mostly with very minutely clavellate tips; primary branches scattered or irregularly approximate in pairs or false whorls, up to 4 (rarely 5) in long, flexuous or somewhat stiff, mostly remotely divided from the base, filiform, angular, very scabrid to rigidly ciliolate, lowest branchlets (secondary divisions) often undivided, very fine, flexuous, bearing a single spikelet, up to 1 in. long, the others forming short cluster-like or elongated 3- or 2-spiculate racemes, their lateral pedicels usually very short, all the divisions of the panicle beset with scattered and usually clavellate-tipped hairs. Spikelets oblong, obtuse, turgid, 2-2½ lin. long, light green with usually purple or blackish tips, glabrous or with a very few small hairs. Glumes similar, broadly rounded on the back, membranous, 5-7-nerved; lower ovate-oblong, obtuse or subacute, two-thirds to three-quarters the length of the lower floret, nerves fine, anastomosing upwards; upper oblong, obtuse. Lower floret 3: valve very similar to upper glume, but slightly shorter; valvule oblong, acute or obtuse, almost as long as valve; anthers $1\frac{1}{2}-1\frac{1}{4}$ lin. long. Upper floret & oblong, acute or obtusely apiculate, as long as or slightly exceeding the upper glume, yellowish or tawny, smooth, glossy; valve and valvule coriaceous-crustaceous. Grain obovoid-elliptic, over 1 lin. long.—Thunb. Fl. Cap. ed. Schult. 104; Stapf in Dyer, Fl. Cap. vii. 403; Wood, Natal Pl. t. 155. *P. unguicu*latum, Trin. Pan. Gen. 187, and in Mém. Acad. Pétersb. 6me sér. iii. 275; Steud. Syn. Pl. Glum. i. 75; Durand & Schinz, Consp. Fl. Afr. v. 767; K. Schum. in Engl. Pfl. Ost-Afr. A. 31, C. 102. P. numidianum, Nees, Fl. Afr. Austr. 33; not of Lam. P. corymbiferum, Steud. l.c. 76: Durand & Schinz, l.c. 744. P. arundinifolium, Schweinf. in Bull. Herb. Boiss. ii. App. ii. 22; Durand and Schinz, l.c. 741; K. Schum, in Engl. l.c. C. 103; Chiov, in Ann. Istit. Bot. Roma, viii. 306. P. pubivaginatum, K. Schum. in Engl. l.c. A. 34, C. 102. P. Menyharthii, Hack. in Bull. Herb. Boiss. 2me sér. i. 766.

Nile Land. Eritrea: Amasen; Ginda, among luxuriant herbage, Schweinfurth, 435, Pappi, 3830! South Abyssinia: Galla Country; Sheikhusim, Donaldson-Smith, 68! and without precise locality, Stordy! Uganda: Ruwenzori, 2600 ft., Emin Pasha; in thickets near Ntakafunvu, 4000 ft., Dummer, 693! Land without precise locality, Lugard! British East Africa: Ukambane, Scott Elliot, 2322! Taro, 1000 ft., Kässner, 495! Makindu, Linton, 103! 168!

Mozambique Distr. Zanzibar, Hildebrandt, 1187! German East Africa: Usambara; Mascheua, Holst, 8816! Tanga, Holst, 2100! Sacleux, 946! Portuguese East Africa: Boruma, Menyharth, 902! Shire Highlands, Buchanan, 59! Also in Natal and Southern Cape Colony.



syn of 3. Brachiaria Sadmilandery

3+ P. acurinatefolium Robyns Congo

1829 not Schumach

3. P. lineatum, Trin. Gram. Ic. et Descr. ii. t. 233. Perennial, 2-3 ft. high. Culms erect or geniculately ascending, many-noded, sparingly branched from one or few of the intermediate nodes, terete, lower internodes short and enclosed in or shortly exserted from their sheaths, upper up to over 4 in. long and more exserted, all softly pubescent, the pubescence intermixed with short clavellate gland-tipped hairs, these more numerous towards the upper part and particularly below the panicle. Leaf-sheaths tight, firmly subherbaceous, terete, prominently striate, ciliate and more or less softly hirsute with fine tubercle-based hairs, gland-tipped hairs mixed in; ligule a short membranous ciliolate rim; blades lanceolate from a broadly rounded and constricted base, long-acuminate with a slender somewhat callous point, $2\frac{1}{2}$ $4\frac{1}{2}$ in. by $\frac{1}{2}$ 1 in., spreading, quite flat, green, firm, finely pubescent on both sides or glabrescent above, often with longer hairs towards the ligule and a dorsally tomentose zone at junction with blade, midrib slender, prominent and whitish below, primary lateral nerves 4-5, differentiated below only with about 5 secondary nerves between. erect, somewhat stiff, terminally or laterally exserted from the uppermost sheath, oblong to ovate-oblong, 3-4 in. by about 2 in., divided to the third degree; common axis slender to filiform, terete or more or less angular, very finely pubescent and like all its divisions slightly wavy, smooth but more or less beset with short clavellate gland-tipped hairs, internodes irregularly shorter and longer (up to 10 lin.); primary branches obliquely spreading, filiform, scantily divided from the base or some distance above it, pubescent downwards; secondary bearing 6-2 rather scattered spikelets from low down, the lower 12-6 lin. long, spreading, but with the pedicels contracted; pedicels very unequal where paired, one very short, the other up to 3 lin. long, all subcapillary, frequently with a few long fine hairs besides the gland-tipped, tips very obscurely discoid. Spikelets oblong, acute, turgid, $1\frac{1}{2}$ - $1\frac{3}{4}$ lin. long, pale green, glabrous. Glumes very thinly membranous, very finely and somewhat prominently nerved; lower ovate, acute, to over two-thirds the length of the spikelet, 5-nerved, the nerve-tips joined by venules; upper of the length and outline of the spikelet, 9-11-nerved. Lower floret barren: valve very similar to upper glume; valvule more or less reduced, oblong, acute, keels scaberulous, flaps rather wide; lodicules often present, but no stamens seen. Upper floret \u2200, broad-oblong, subacuminate, $1\frac{1}{2}$ by almost $\frac{3}{4}$ lin., yellowish, polished; valve and valvule subcoriaceous, the incurved margins of the valve wide, the latter faintly 7-nerved, the nerves joined by venules in the tip; anthers not much over ½ lin. long.—Kunth, Enum. Pl. i. 109; Trin. Pan. Gen. 199; Steud. Syn. Pl. Glum. i. 83; Stapf in Johnston, Liberia, ii. 666.

Upper Guinea. Sierra Leone: Kanya, 1500 ft., Thomas, 3015! 3037! Yombana, Thomas, 4049! Kumrabai, 50 ft., Thomas, 6782! 7049! 7107! and without precise locality, Morson! Liberia: within 20 mil. of Kakatown, Whyte!

4. P. adenophorum, K. Schum. in Engl. Pflauzenw. Ost-Evidently perennial, apparently a tall rambling Afr. C. 103. grass. Culms moderately slender, terete, many-noded, simple for a long distance from the panicle downwards, internodes enclosed or very shortly exserted, pubescent upwards, the hairs from Leaf-sheaths very tight, terete, pubescent like small tubercles. the culms, striate; ligule a densely ciliate rim; blades lanceolate-linear from a slightly rounded base, long- and acutely acuminate, $3-3\frac{1}{2}$ in. by 3-5 lin., spreading, flat, rather firm, pale to glaucousgreen, finely pubescent all over, margins rough, midrib very fine, whitish below, not or indistinctly differentiated above from the very numerous and close nerves. Panicle hardly exserted from the uppermost sheath, rather flexuous, broad-ovate in outline, 4 in. (up to 8 in. according to Schumann) by almost 3 in., widely open and very loose, divided to the third degree, bearing on the common axis and all its divisions spreading hairs with clavellate tips; common axis filiform, angular, very finely shortly and loosely hairy except for the clavellate hairs, internodes 9-6 lin. long; primary branches very loosely divided from the base or very near it, subcapillary, flexuous, terete, smooth, glabrous except for the scanty clavellate hairs, the longest up to almost 3 in. long, internodes 10-5 lin. long; secondary up to over 1 in. long; very scantily and distantly divided; pedicels very unequal, lower short to very short, upper and terminal up to 5 lin. long, very flexuous, all with very fine long hairs (besides the clavellate) towards the discoid tips. Spikelets elliptic-oblong, obtuse, up to 1½ lin. long, somewhat turgid, pale green, variegated with purple, quite glabrous. Glumes unequal, membranous, faintly nerved, concave; lower obliquely lanceolate or ovate-lanceolate, subacute in profile, $\frac{1}{2}$ lin. long, 5-nerved; upper obliquely oblong in profile, rather broad-elliptic when flattened out, subobtuse, as long as the spikelet, 9-nerved. Lower floret 3; valve very similar to upper glume, but slightly narrower; valvule oblong, subacute, almost as long as the valve, keels minutely scaberulous; anthers 1 lin. long. Upper floret \subseteq , oblong, subobtuse, $1\frac{1}{4}$ lin. long, whitish: valve and valvule tough, papery, smooth or obscurely granular.

Nile Land. Uganda: Ruwenzori; very common in open places in the forests, 5000-8000 ft., Scott Elliot, 7640! Ankole; in shady woods near Ruhanga, 8200 ft., Stuhlmann, 2143, 2331.

5. P. flaceiflorum, Stapf. Annual (?), base unknown, up to 3 ft. high (according to the collector). Culms very slender, anfractuous and much branched up to the middle with the branches flowering, angular, spreadingly and shortly pubescent upwards, terete, glabrous except for some gland-tipped hairs below the panicle, and very smooth and almost filiform, internodes short in the branched part, much longer above. Leaf-sheaths loose, subherbaceous, strongly striate, softly and loosely hirsute with tubercle-based hairs, the lower and intermediate shorter to (upwards) much shorter than the

4 + P. pole-evansi Hubh N. Rhodesia Pole Evans 30 3 9(46). spklts smaller than in adenspharum.





5+P. nigromarginaturn Robyns Corlge Belge

5++ P. pisantuense Vandery; Robyns

internodes and pushed aside by the branches, the uppermost up to almost 3 in. long, slightly inflated; ligule reduced to a line of short cilia; blades linear-lanceolate from a rounded base, acutely acuminate, $1\frac{1}{2}-2\frac{1}{2}$ in. by $3-4\frac{1}{2}$ lin., flat, very flaccid, green, finely hirsute on both sides and along the margins, hairs (particularly the marginal) tubercle-based, midrib very slender, primary lateral nerves 3 on each side, very fine, distinct below only. Panicles longexserted, ovate to oblong in outline, open and very loose, more or less flaccid, $2-2\frac{1}{2}$ in. by $1\frac{1}{2}$ in., divided to the second or third degree; common axis filiform, terete, with scattered gland-tipped hairs, otherwise like all its divisions glabrous and smooth, internodes 8-5 lin. long, here and there with a much shorter one intermixed; primary branches capillary, spreading, flexuous, the lower about 1 in, long, very loosely divided from the base, its divisions representing paired or upwards solitary pedicels, $1\frac{1}{2}$ lin. long, with slightly thickened truncate tips. Spikelets oblong, obtuse or subacute, slightly turgid, 2 lin. long, pale green, glabrous. Glumes very unequal, thinly membranous, slightly rough and finely nerved; lower very broad, truncate-obtuse, 9-11-nerved with the nervetips joined by transverse venules; upper of the length and outline of the spikelet, 9-nerved. Lower floret barren: valve very similar to upper glume; valvule as long as valve or shorter, thinly hyaline, oblong, subacute, with softly ciliate keels and narrow flaps. Upper floret &, oblong, subacute, 13 lin. long, whitish; valve and valvule papery, the valve finely 9-nerved with the nerves joined by transverse venules close to the pubescent tip; anthers over $\frac{1}{2}$ lin. long.

Mozambique Distr. German East Africa : Unyamwezi ; Mikinga (4° S. Lat.), 3800 ft., Grant !

6. P. maximum, Jacq. Ic. i. 2, t. 13; Collect. i. 76. Perennial, up to over 10 ft. high, densely tufted on a short sometimes very stout rhizome covered with the appressedly hairy remainders of cataphylls; innovations mostly intravaginal. Culms erect or geniculate-suberect, usually stout (up to over 3 lin. in diam.), 3-4-noded, simple or sparingly branched with the branches erect, terete or compressed below, usually quite glabrous and smooth, more rarely more or less hirsute and rough from the tubercular hair-bases. Leaves glabrous or more or less softly hairy or coarsely hirsute with tubercle-based hairs; sheaths rather firm, the lower compressed, the others terete and tight, more or less striate, often bearded at the mouth and usually so at the nodes, beards silky, very variable in length and density, rarely the nodes quite glabrous; ligule membranous, very short, ciliolate, usually with dense hairs from behind it; blades linear from an equally wide or very gradually narrowed and shortly contracted base, long-tapering to a fine (sometimes convolute and filiform) point, $\frac{1}{2}$ -2 ft. by 2-9 or occasionally even 12 lin., flat, margins scaberulous to spinulously scabrid, midrib prominent below and

(of large leaves) stout, whitish and shallowly channelled above, primary nerves up to 9 on each side, very slender and often indistinctly differentiated. Panicle erect or nodding, contracted or open, from \frac{1}{2} to over 1\frac{1}{2} ft. long, glabrous or more often villosulous at the lower nodes and motile branch bases, divided to the fourth or fifth degree, all the divisions filiform to finely filiform or capillary, often more or less wavy, angular and scabrid or the larger smooth downwards; primary axis comparatively slender, smooth, terete and often fluted below, scaberulous upwards; lower primary branches whorled, subcrect or spreading (rarely by more than 30°), up to 1 ft. long, mostly remotely divided from 1-3 in. above the base, their lower branchlets often up to 3 in. long, flexuous and remotely divided or like the rest rather short and contracted; penultimate divisions usually closely 2-3-spiculate with the lateral pedicels shorter than the clustered spikelets, more rarely loose to very loose with the pedicels several times longer; all the pedicels very fine with small subcupular tips. Spikelets oblong, subobtuse to acute, somewhat turgid, broadly rounded on the back, $1\frac{1}{2}-1\frac{3}{4}$ or sometimes 2 lin. long, light green or tinged with purple, glabrous or rarely more or less densely pubescent. Glumes very dissimilar, faintly nerved; lower rounded or shortly acute or minutely apiculate, about one-third to one-quarter the length of the spikelet, hyaline, 3-1-nerved or almost nerveless; upper glume corresponding in shape and size to the spikelet, membranous, 5-nerved. Lower floret 3: valve like the upper glume, 7-nerved; valvule slightly shorter, oblong, obtuse. Upper floret &, oblong, shortly acute, up to almost 1½ lin. long, whitish; valve and valvule thinly crustaceous, finely transversely rugose except on the flexures. Anthers $\frac{1}{2}$ $\frac{3}{4}$ lin. long. Grain over $\frac{1}{2}$ lin. long.—Trin. Pan. Gen. 180, and in Mém. Acad. Pétersb. 6me sér. iii. 268; Nees, Fl. Afr. Austr. 36; Hook. Niger Fl. 560; Steud. Syn. Pl. Glum. i. 72; Griseb. Fl. Brit. West Ind. 549; Doell in Mart. Fl. Bras. ii. ii. 202; Oliv. in Trans. Linn. Soc. xxix. 171; Baker, Fl. Maurit. 436; Hack. in Bolet. Soc. Brot. iii. 135, vi. 140; Martelli, Fl. Bogos. 91; Klatt in Jahrb. Hamb. Wissensch. Anst. ix. (1891) 120; Engl. Hochgebirgsfl. Trop. Afr. 119; Durand & Schinz, Consp. Fl. Afr. v. 753 (mostly); Penzig in Att. Congr. Bot. Genoa, 1893, 366; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 21, 95, and Plant. Util. Eritrea, 53; K. Schum. in Engl. Pfl. Ost-Afr. B. 81, C. 103; Franch. Contr. Fl. Congo Franc. 37; Durand & Schinz, Études Fl. Congo, i. 323; Hook. f. Fl. Brit. Ind. vii. 49, and in Trimen, Handb. Fl. Ceyl. v. 153; Chiov. in Ann. Istit. Bot. Roma, vi. 166; vii. 64; viii. 33, 306, and in Result. Scient. Miss. Stefanini-Paoli, i. Bot. 226; Stapf in Dyer, Fl. Cap. vii. 404, and in Kew Bulletin, 1907, 213; Rendle in Cat. Afr. Pl. Welw. ii. 181; De Wild. & Durand, Contr. Fl. Congo, fasc. ii. 72 (partly), and in Bull. Herb. Boiss. 2me sér. i. 61; De Wild. Not. Pl. Util. Congo, i. 63-68, 504-506, and Miss. E. Laurent, 201; Wood,



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Natal Pl. t. 156; Th. & Hél. Durand, Syll. Pl. Congol. 633; Hitchcock & Chase in Contrib. U.S. Nat. Herb. xv. 78; Lanza & Mattei, Pl. Erythr. 107; Cheval. Sudania, 68; Rendle in Journ. Linn. Soc., Bot., lx. 224; Eyles in Trans. R. Soc. South Afr. v. 300, incl. var. trichoglume. P. maximum, var. hirsutissimum, Oliv. in Trans. Linn. Soc. xxix. Bot. 171; P. maximum, var. obtusissimum, Stapf in Cheval. l.c. 161, 163 (name). P. polygamum, Sw. Prodr. Ind. Occ. 24. P. læve, Lam. Ill. i. 172. P. jumentorum, Pers. Syn. i. 83; H. B. & K. Nov. Gen. & Sp. i. 104; Duthie, List Grass. N.-W. Ind. 5, and Fodd. Gr. N. Ind. 9. P. altissimum, Brousson. Elench. Hort. Monsp. 42; not of Meyer. P. trichocondylum, Steud. Syn. Pl. Glum. i. 74. P. pample-moussense, Steud. l.c. 71. P. hirsutissimum, Steud. l.c. 72. P. trichoglume, K. Schum, ex Engl. Glied. Veget. Usambara, 38 (name only). P. Chlorochloe, K. Schum. in Engl. Jahrb. xxiv. 333. P. sp. no. 5, Grant in Speke, Nile Journal, App. 652. P. giganteum, Mez in Engl. l.c. xxxiv. 143.

Upper Guinea. Cape Verd Islands: St. Vincent, Milne! S. Nicalão, Lowe, 56! S. Jago; Lowe! Portuguese Senegambia: Bolama Island, Carvalho! Sierra Leone: without precise locality, Vogel, 128! Gold Coast: Dadour Plains, Johnson, 999! Dahomey: Cotonou, Chevalier, 4469! Southern Nigeria: Lagos; Dalziel, 1311! Davodu, 43! Ala, Thomas, 1972! Opobo, Jeffreys, 1! Quorra, near Attah, Vogel, 36! Idu, on the Engemi River, Holland, 130! Northern Nigeria: Lokoja, Migeod, 72! Dalziel, 285! Abinsi, Dalziel, 904! "On the Niger," Baikie! Cameroons: near Batanga, "the most abundant grass in open places, excluding almost everything," Bates, 101! St. Thomas Island, 820-2100 ft., Moller, 135! Don!

North Central. Bagirmi: Tchekna, Chevalier, 9543! Arahil, Chevalier,

Nile Land. Monbuttu Country: on the Welle, Schweinfurth, 3184! on the Kussumbo River, Schweinfurth, 3174! Niamniam country: on the Nabambisso River, Schweinfurth, 3702! Eritrea: Ghinda, 3300 ft., Schweinfurth, 213!* Ocule Cusai; Decamerè, 6560 ft., Pappi, 1705! Habab, Hildebrandt, 354! quoted by Penzig, Martelli, Schweinfurth, Chiovenda, Lanza and Mattei from numerous other localities throughout the colony up to 8500 ft.; Abyssinia: Jaja, 4000–6500 ft., Schimper, 319! Tigre; Hamedo plains, 4900 ft., Schimper, 1098! Southern Abyssinia: by the Dawa River, Riva; and without precise locality, Stordy! British Somaliland: between Hargeisa and Berbera, Robecchi; Golis Range, Drake-Brockman, 383! near Bohotle, Burao and Upper Sheikh, Appleton! Jebel Serrut, near Meid, 5250 ft., Hildebrandt, 1482! Italian Somaliland: Jub Valley near Elvalda, Scasselatti & Mazzocchi, 103; on dunes near Brava, Mangano, Uganda: Kipayo, 4000 ft., Dummer, 666! Victoria Nyanza region, Maitland, 155! Usoga, Scott Elliot, 7171! British East Africa: Majichumwi, Scott Elliot, 6145!* Ukambane, 5000–6000 ft., Scott Elliot, 6707! Makindu, Linton, 116! Siani, 300 ft., Kässner, 345! Nairobi, Linton, 6! Miss Johnstone, 57! Kibose, Powell, 12! Dummer, 1902! Kisumu, Dummer, 1805! 1853! Witu, Thomas, 123! Rabai Hills and Freretown near Mombasa, Taylor! near Kau, in a saltmarsh in the Ozi River Basin, Gregory! Takangu, at sea-level, Battiscombe, 456! Mombasa to Lamu, Grant, 880!

Lower Guinea. Annabon Island, Burton! French Congo: Brazzaville, Brazza & Thollon, 220, 221; Chevalier, 11216! Libreville, Dybowski, 188. Belgian Congo: Lower Congo, Smith! Burton! Banana Div.; Moanda, Vanderyst. Boma Div.; Boma, Van Houtte; Bingila, Dupuis. Matadi Div.; Matadi, É. Laurent. Cataracts Div.; Luvituku, Demeuse; and without precise locality, É. Laurent. Stanley Pool Div.; Dembo and Kisantu, Gillet; Kutadi,

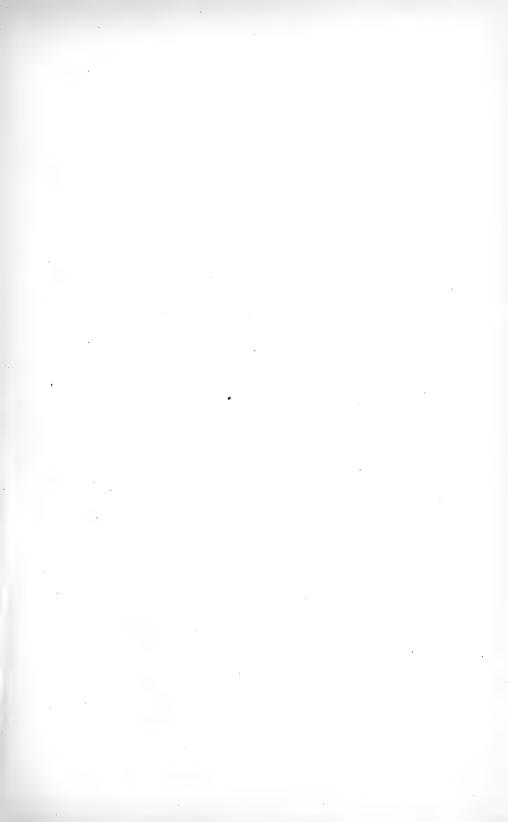
Dupuis; Bokala, Vanderyst, 3688! Kwango Div.; Eiolo, É. Laurent. Angola: Barra do Bengo; in damp sandy mud near Cacuaco, Welwitsch, 7286! Loanda; Welwitsch, 7362! 7362 b! Cazengo, Gossweiler, 4661! Golungo Alto; edges of woods, Welwitsch, 2990! Bumba district; by the Guiapoze River, Welwitsch, 7187! 7239! 7240! Molembas, Welwitsch, 1087; Pungo Andongo, Welwitsch, 2863! Benguella; country of the Ganguellas and Ambuellas, Gossweiler, 1672. 1672! among rocks in open forest, between Gambo Fort and Mission Station, $Pearson, 244 ilde{3}!$

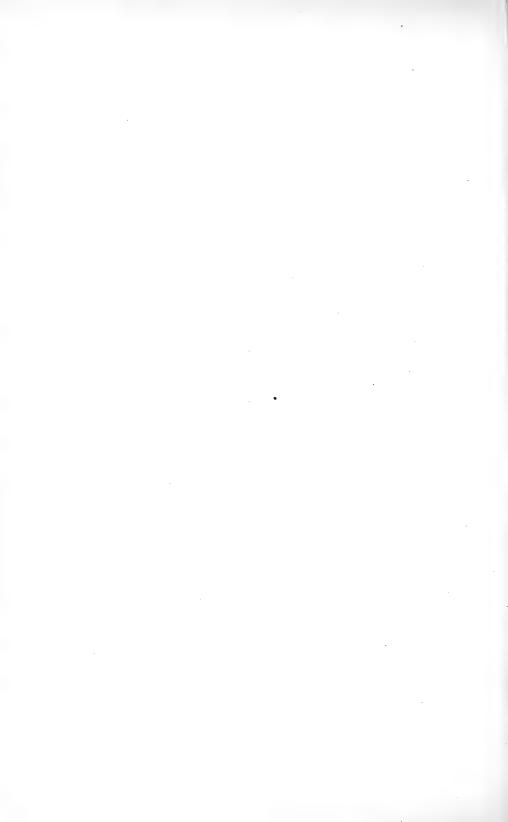
South Central. Belgian Congo: Lake Léopold II. Div.; Fini, É. Laurent. Equator Div.; Eala, M. Laurent; Wangata, E. Laurent. Bangala Div.; Upoto, Wilwerth; Lisha, Hens, and without precise locality, Demeuse. Aruwimi Div.; Basoko (collector not recorded). Kasai Div.; Leki, É. Laurent; Luluabourg, Gentil. Province Orientale; Kavala Island, Kidston, 7!

Mozambique Distr. Zanzibar: in hedges, Hildebrandt, 1084! 1085! Last! Wendland, 22! German East Africa: Usambara; Buiti, Holst, 2391! Masheua, Holst, 8716!* 8798! and without precise locality, Buchvald, 207! Kilimanjaro; near Uschiri, Volkens, 394! Marangu, Volkens, 1475! Ushashi; Neuwied on Ukerewe Island in Lake Victoria Nyanza, Conradi, 106! Unyanyembe; Kwale River, Grant! Ujiji, Gonda, Böhm, 156! Rovuma Bay, Kirk! Usaramo, Stuhlmann, 6553, 6712, 6754. Nyasaland: Chiromo, Scott Elliot, 8692! 8694! Portuguese East Africa: Msalu River, Allen, 139!* east coast of Lake Nyasa, Johnson, 95! near Sena, Kirk! between Shupanga and Sena, Kirk! Boruma, Menyharth, 912 b!* Beira, Rogers, 4546! Rhodesia: Mumbwa, 15° S. 28° E. Mrs. Macaulay, 39! Victoria Falls, Allen, 260!* Mrs. Craster, 67! Rogers, 18. Matautay, 59: Victoria Fairs, Atten, 200: Mrs. Craster, 01: Rogers, 5630*! 7036. Livingstone, Rogers, 7054! Mashonaland; Salisbury, Nobbs, 617! 618! Matabeleland; Insiza Distr., Mundy! Bulawayo, Rogers, 8072; Heany Junction, Jeffreys, 12; Tabaindima, Jeffreys, 32; Bechuanaland: Mochudi, Rogers, 6701!* Gazaland: Chirinda outskirts, 3700–4000 ft., Swynnerton, 417 b! Ngamiland, Stigand!

Also throughout South Africa, Madagascar, the Mascarenes and in Yemen. Introduced and widely spread in India and America. Known in Brazil as "Capim (grass) de Angola," which name is, however, also applied to other grasses. It is commonly cultivated in the tropics under the name "Guinea grass" and has the reputation of being one of the best fodder grasses of the tropics. Apart from the more acute or blunt tips of the spikelets and their glabrous or pubescent condition the species is very uniform. The specimens with pubescent spikelets have been marked with an * in the enumeration. state has been distributed as P. trichoglume by K. Schumann (Holst, 8716) and noted as P. maximum, var. trichoglume by Eyles. Its incidence and distribution hardly suggest a definite and geographically fixed variety.

7. P. infestum, Peters, Reise Mozamb. Bot. 546 (name only). Perennial, up to over 4 ft. high, compactly tufted on a very short rhizome with intravaginal innovations. Culms erect or geniculately ascending, rather slender (not much over 1 lin. in diam.) 4-5-noded, sparingly branched with long erect branches, compressed below, terete above, usually softly hairy below the nodes, hairs spreading or subappressed, sometimes very long. Leaf-sheaths tight, the lower much compressed, strongly keeled, up to over 6 in. long, the upper terete below but keeled upwards, all finely striate or more strongly so at the base and more or less softly hirsute to almost villous, particularly towards the densely bearded nodes, or the uppermost glabrous upwards, but mostly with a band of hairs or a beard at the junction with the blade; ligules very short, membranous, truncate, silkily ciliate; blades erect, linear from a long and often much attenuated folded and keeled base, flat above the latter, tapering,





to a long slender point, up to $1\frac{1}{2}$ ft. long, from 1 lin. wide at the folded base to over 5 lin. at the flat middle, rather firm and flexuous, more or less hairy like the sheaths, midrib slender, but very prominent below from the keeled portion of the blade upwards, nerves fine and very close, the primary laterals hardly differentiated. Panicle 6-9 in. long, of 7-10 suberect fastigiate slender spiciform branches borne singly and at subequal or upwards shortened distances on a common axis, 3-4 in. long, slender, more or less terete and pubescent or beset with long spreading hairs below, angular and scabrid upwards; branches 3-5 in. long, the uppermost or at least some of them quite as long as the rest, filiform, upwards triquetrous, scabrid, bearing from the villosulous or pubescent base, or a short distance above it, 3-2-spiculate clusters or short racemes of spikelets, usually distant by less than their own length, the nodes usually with some long fine spreading white hairs; pedicels subcapillary, scaberulous, often with long spreading hairs from below the minutely cupular tips, those of a cluster very unequal, the longest rarely much over 1 lin. long. Spikelets oblong, acutely or mucronate-apiculate, from not quite $1\frac{1}{2}$ to over $1\frac{3}{4}$ lin. long, green or slightly tinged with purple, with usually black-purple tips, glabrous. Glumes very dissimilar, lower broad-ovate, subacute, about the length of the spikelet, subhyaline, faintly 3-nerved; upper corresponding in size and outline to the broad back, convex, membranous, faintly Lower floret 3: valve very like the upper glume, but the back depressed along the midnerve; valvule oblong, acute, flaps much widened downwards; anthers \(\frac{3}{4} \) lin. long. Upper floret \(\frac{1}{2}\), oblong, obtuse, about 1-1\(\frac{1}{4}\) lin. long, whitish; valve and valvule thinly crustaceous, finely transversely rugose.—Durand & Schinz, Consp. Fl. Afr. v. 751. *P. lasiocoleum*, K. Schum. ex Engl. Glied. Veget. Usambara, 14, 23, 35 (name only).

Nile Land. British East Africa: Tanaland, Linton, 209!
Mozambique Distr. Zanzibar, Stuhlmann! German East Africa: Usambara;
savannas near Tanga, Sacleux, 2000! Duga Bush, Holst, 3206! Portuguese
East Africa: Mozambique; in moist sand on the Querimba coast, Peters!

8. P. trichocladum, Hack. ex Engl. Hochgebirgsfl. Trop. Afr. 119 (name); K. Schum. in. Engl. Pfl. Ost-Afr. C. 103. Perennial, rambling or climbing up to 8 ft. Culms slender, many-noded, branched, particularly from the prostrate much geniculate and sometimes rooting bases, terete or the lowest compressed, glabrous or sometimes finely pubescent or softly and spreadingly hirsute below the nodes, the older internodes often completely bared. Leaf-sheaths rather firm, terete, the lower frequently slipping off the culms or breaking away, the upper tight, all usually quite glabrous and smooth except at the mouth, rarely softly pubescent all over, beardless at the nodes; ligules reduced to a narrow membranous ciliolate rim; blades almost horizontally spreading, linear-lanceolate

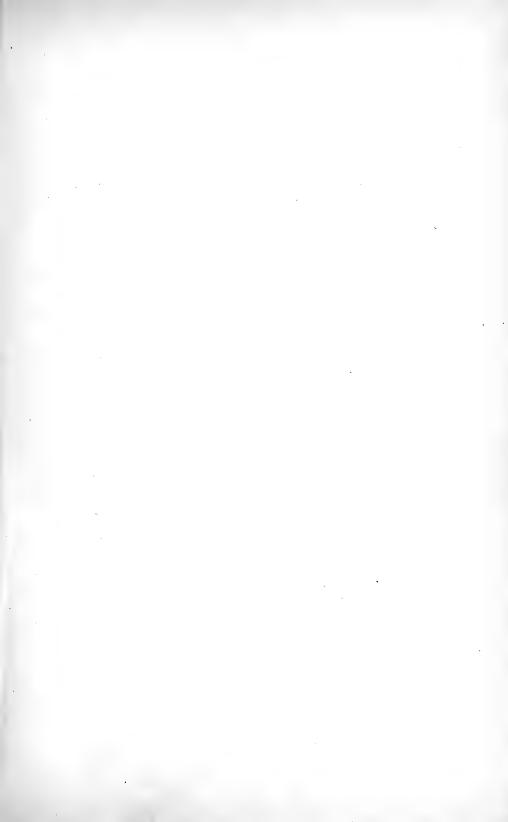
Pracon.

from a suddenly contracted and rounded base, tapering to a long fine point, $1\frac{1}{2}$ -6 in. by 3-7 lin., thin, flat, green, more or less softly and shortly hairy, sometimes almost velvety, rarely quite glabrous, midrib very slender, whitish; primary lateral nerves 3-4 on each side, usually inconspicuous, margins scabrid to minutely spinulose, sometimes crisped. Panicle soon expanding and then usually permanently open and extremely loose, broad-oblong to ovate in outline, 2-6 in. by 2-3 in., divided to the second or third or low down to the fourth degree, all the divisions subcapillary to capillary, flexuous or wavy, finely scaberulous, like the very slender primary axis more or less beset with long fine spreading white hairs, or at least the principal towards their bases and the pedicels below their tips, hairs of the axis usually tubercle-based, primary branches solitary or irregularly approximate, the lower mostly divided from 3-4 lin. (rarely up to 1 in.) above the base; pedicels very slightly thickened upwards, frequently paired, those of a pair very unequal, the shorter from 1/2 (rarely) to 3 lin., the longer up to 8 lin. long. Spikelets oblong, obtuse, somewhat turgid, $1\frac{1}{4}$ to over $1\frac{1}{2}$ lin., pale green or flushed with purple, glabrous. Glumes very dissimilar, faintly nerved; lower very small, rounded, very obtuse, one-seventh to one-fifth (rarely one-third) the length of the lower floret, hyaline, nerveless; upper corresponding in size and shape to the spikelet, membranous, broadly rounded on the back, 5-nerved. Lower floret of: valve very like the upper glume, 5-6-nerved; valvule almost as long, oblong, subacute, with broad flaps throughout; anthers almost 1 lin. long. Upper floret &, oblong, acute, almost as long as the lower, whitish, smooth, slightly glossy; valve and valvule thinly crustaceous.—Durand & Schinz, Consp. Fl. Afr. v. 766. P. trachycladum (sphalm.), K. Schum. in Engl. Pfl. Ost-Afr. A. 108.

Nile Land. Uganda: Ruwenzori; Kabamaga, Scott Elliot, 7591! Entebbe, Fyffe, 17! edge of swamps, Kipayo, 4000 ft., Dummer, 2417! and without precise locality (Damia?) Scott Elliot, 7131! British East Africa: Aberdare Range, Dowson, 78! Rabai Hills, Taylor! Ngatama, Taha plains, Gregory! in sandy plains in the Sabaki Valley, Gregory!

Mozambique Distr. Zanzibar: rambling in shrubs, Hildebrandt, 1088! Kirk! Last! German East Africa: Tanga District; Amboni, Holst, 2680! Ukinga; Kyimbali, Stolz, 1176! Nyasaland: Msalu, Allen, 117! Portuguese East Africa: Zambesi Delta; "forming high masses resting on shrubs" on the sea coast near Luamo, Kirk! right bank of Luabo, Kirk, 35!

9. P. transvenulosum, Stapf. Evidently perennial. geniculate, terete, smooth, glabrous, more than 6-noded, branched from the lower and intermediate nodes, branches obliquely erect or almost in continuation of the preceding internode, pushing the main culm aside. Leaf-sheaths tight, terete, glabrous except along the ciliolate or pubescent margins, shorter than the internodes, strongly striate; ligule a ciliolate rim; blades linear-lanceolate from a slightly rounded base, long and finely acuminate, 3-4 in. by 4-7 lin., spreading, green, rather thickly herbaceous, sparingly and



10 = P. Junaense Vander 1919 fide Rolyno

minutely hairy or almost glabrous, margins finely cartilaginous and scaberulous, midrib very slender, whitish, primary lateral nerves between them, these connected by numerous fine transverse veins, visible in transmitted light or sometimes owing to their being raised in the dried plant. Panicles partly enclosed (permanently?) in the uppermost sheath, 4-5 in, long, divided to the third or fourth degree; common axis slender, like all its divisions angular and scaberulous or scabrid except downwards, lowest and intermediate internodes up to 1 in. long; primary branches solitary, suberect, filiform, flexuous or wavy, suberect, loosely divided from the base, its branchlets more or less appressed, 1-1½ in. long, bearing 5-2 spikelets; pedicels ½-2 lin. long, tips minutely discoid. Spikelets ovatelanceolate, acute, $1\frac{1}{2}-1\frac{3}{4}$ lin. long, green or variously tinged with purple, quite glabrous. Glumes very unequal; lower more or less hyaline, rounded, obtuse or subacute, finely 1-nerved or nerveless, about one-third the length of the spikelet; upper of the size and outline of the spikelet with the tip involute upwards and thereby apparently acutely acuminate, membranous, 5-nerved, nerves prominent upwards, the outer joining the inner side-nerves below the tip. Lower floret 3: valve very similar to the upper glume if not slightly shorter and narrower; valvule oblong, obtuse, almost as long as the valve; anthers $\frac{3}{4}$ lin. long (mature?). Upper floret \heartsuit , oblong, acute, 1\frac{1}{4} lin. long, whitish, polished; valve and valvule tough, papery to subcoriaceous; anthers almost 1 lin. long.

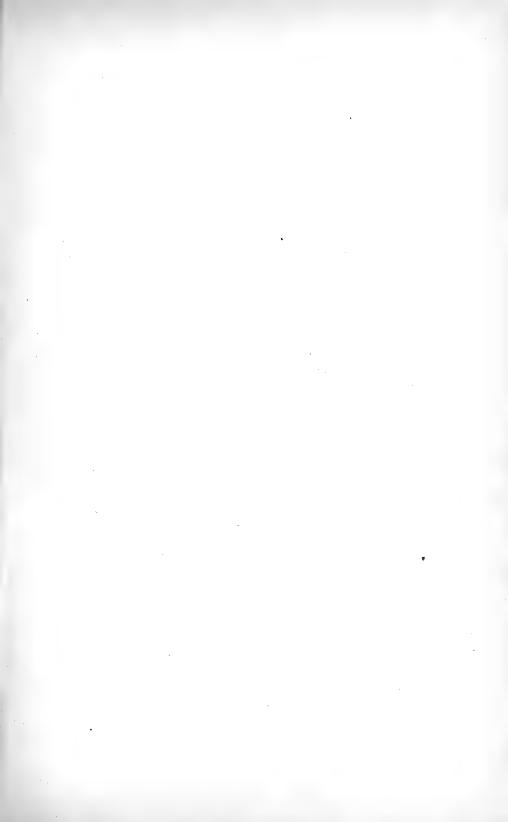
Nile Land. Uganda: Mau forest, 8000 ft., Scott Elliot, 6922!

10. P. spongiosum, Stapf. Perennial, up to 3 ft. high, from a short rhizome. Culms erect, stout (up to 3 lin. diam.) and very spongy up to beyond the middle, then slender, terete, very smooth and glabrous, prominently striate, simple, about 7-noded, nodes enclosed or shortly exserted. Leaf-sheaths loose, terete, striate, somewhat spongy, the lowest appressedly hairy all over, one or two of the following hairy at the nodes only, otherwise like the upper quite glabrous and smooth, the basal finally decaying; ligule a very narrow densely ciliolate rim; blades very narrow, linear, very gradually tapering from the base, which is as wide as or narrower (lower leaves) than the mouth of the sheath, to a blunt tip, up to 1 ft. long by 1½ lin., more or less convolute, more or less spongy, particularly towards the base, glabrous, smooth, midrib rather wide but slightly raised below and very distinct, lateral nerves fine and close above, a few of them more or less differentiated below as primary nerves. Panicles enclosed with their base in the uppermost sheath, oblong, over 3 in, long, divided to the third degree; common axis slender, angular, filiform upwards, like all its divisions quite smooth and glabrous; internodes 5-8 lin. long with a few which are much shorter intermixed; primary branches finely filiform, solitary, very loosely divided from the base (or the lowest entire up to 9 or

10 lin.), longest $2-1\frac{1}{2}$ in. long; secondary branches capillary, the lower 10-5 lin. long, bearing 4-2 approximate spikelets from the middle; pedicels $\frac{1}{2}$ to (the terminal) 2 lin. long, tips slightly thickened. Spikelets oblong, obtuse or subobtuse, subterete and somewhat turgid, $1\frac{1}{2}$ lin. long, green, glabrous. Glumes very unequal, very thinly membranous; lower ovate, obtuse, faintly 1-nerved, up to one-third of the spikelet; upper of the length and outline of the spikelet, very finely 7-nerved. Lower floret \circlearrowleft : valve similar to the upper glume, 9-nerved; valvule slightly shorter, oblong, acute; anthers $\frac{3}{4}$ lin. long. Upper floret \circlearrowleft , oblong, subacute, over $2\frac{1}{4}$ lin. long, whitish, polished; valve and valvule thinly subcoriaceous, the former pubescent at the tips.

Lower Guinea. Belgian Congo: Stanley Pool Distr. (?); Bugumu, Vanderyst, 4322!

11. P. brazzavillense, Franch. Contrib. Fl. Congo Franç. 33 (in Bull. Soc. Hist. Nat. Autun, viii. 341). Perennial, 9-12 in. high, compactly tufted with extravaginal innovations; cataphylls firm, pale, glabrous, very smooth. Culms erect, very slender, terete, simple, 1-2-noded with the (upper) node at or below the middle, glabrous. Leaves crowded at the base; sheaths terete, tight, firm, minutely auricled, quite glabrous and smooth, prominently striated, the basal 1-1½ in. long, long-persistent and coating the culms and innovations; ligule reduced to a ciliolate rim; blades of the basal leaves setaceous, slightly blunt, terete or laterally somewhat compressed, deeply channelled, 5-8 lin. by up to over $\frac{1}{4}$ lin. across, of the culm-leaves much shorter (down to less than 1 in.), rigid or subflexuous, wiry, glabrous, smooth except along the margins, midrib and lateral nerves quite obscure outside. Panicle contracted or more or less open, up to $1\frac{1}{2}$ in. by 4-10 lin., divided to the third degree; common axis filiform, terete or subterete, smooth, lowest internodes up to $\frac{1}{2}$ in. long; lower primary branches usually divided from the base or close to it, forming scanty imperfect false whorls, the longest equalling three-quarters of the panicle, subcapillary, smooth; ultimate divisions finely capillary, flexuous; pedicels 1-2 lin. long, tips minutely discoid. Spikelets broad-elliptic in outline, acute to subacute or apiculate, about \(\frac{1}{8} \) lin. long, pale green, here and there with a bronzy metallic lustre or dark violet, glabrous. thinly membranous, very concave, finely and somewhat prominently nerved, broad-oblong in profile, shortly acute or apiculate, the lower three-quarters the length of the lower floret, 3-nerved, the upper as long as or almost as long as the lower floret, 5-nerved. Lower floret 3; valve very similar to the upper glume; valvule slightly shorter, acute, keels almost quite smooth; anthers \frac{2}{5} lin. long. Upper floret $\mbox{$\mbox{$\mbox{$\downarrow$}}$, ovate in outline, acute or subacute, <math>\mbox{$\frac{1}{3}$ lin. by $\frac{1}{5}$ lin.}$ or slightly larger; valve and valvule thinly papery, whitish, smooth or very sparingly and minutely verrucose; anthers $\frac{3}{10}$ lin. long.—



12+P. Sapini Vander) Robyns Ssachne Sapini Vander Congo Belge

12+ + P. Homblei Robyns Congs Belge Isachne filifolia, Franch. Contr. Fl. Congo Franç. 32 (in Mém. Soc. Hist. Nat. Autun, viii. 340).

Lower Guinea. Gaboon: plains of Denys, Griffon du Bellay, 265! Corisco Island, in meadows, Mann, 1890! French Congo: Brazzaville, Thollon, 876!

12. P. ianthum, Stapf. Perennial, in small tufts, not much over 1 ft. high, innovations extravaginal. Culms erect, terete, glabrous, slender, simple, 2-noded, intermediate and upper nodes long-exserted. Leaf-sheaths tight, terete, smooth and glabrous, dull purple, the basal at length somewhat loosened and more or less persistent; ligule a narrow ciliate rim; blades setaceously convolute from an equally wide base, tips slightly blunt, 2-4 in. long, up to $\frac{1}{2}$ lin. across, flattened out almost 1 lin. wide, rigid, almost wiry, smooth, glabrous below, loosely and long-hairy above, particularly downwards, finely and closely nerved, midrib and primary nerves hardly differentiated. Panicle erect, narrow, oblong, $\frac{1}{2}$ -3 in. long, rather loose, divided to the third or fourth degree, vividly tinged with violet; common axis slender, terete, smooth, lowest internodes $\frac{1}{2}$ in. long; lower primary branches usually divided from the base (rarely undivided for some distance), forming very unequal fascicles or imperfect false whorls, finely filiform, smooth, longest two-thirds to three-quarters the length of the panicle; ultimate divisions capillary, wavy, quite smooth; pedicels 1 to over 2 lin. long. Spikelets rotundate-elliptic in outline, $\frac{3}{4}$ lin. long, dark violet, somewhat turgid, spreadingly and loosely pubescent. Glumes subequal, membranous, semi-elliptic in profile, obtuse or subacute, slightly shorter than the spikelet, the lower with 3, the upper with 5 fine slightly prominent nerves. Lower floret of; valve very similar to the upper glume, if not thinner and more faintly nerved, pale violet or greenish, very sparingly hairy; valvule slightly shorter, keel slightly rough; anthers \(\frac{3}{8} \) lin. long. Upper floret ovate in outline, subacute, $\frac{1}{2}$ lin. long; valve and valvule thinly papery, pale violet, very sparingly and minutely verrucose; warts spindle-shaped.—P. Frederici, var. minor, Rendle in Cat. Afr. Pl. Welw. ii. 181.

Lower Guinea. Angola: Huilla, in damp pastures, Welwitsch, 2671! Mozambique Distr. Rhodesia: M'rewa, near water, Appleton, 6!

13. P. Frederici, Rendle in Cat. Afr. Pl. Welw. ii. 180 (excl. var.). Perennial (base unknown). Culms erect, probably rather tall, slender, terete, smooth, glabrous, uppermost 2 internodes 6-4 in. long, the uppermost hardly exserted during flowering. Leaf-sheaths terete or subcarinate upwards, tight, firm, slightly auriculate, glabrous, smooth, striate; ligule a membranous ciliolate rim about $\frac{3}{8}$ lin. high, laterally adnate to the auricles; blades setaceously convolute with a sharp point, downwards slightly laterally compressed and obscurely keeled, the upper $5-3\frac{1}{2}$ in. long, $\frac{1}{2}$ lin. across at the middle, up to $\frac{7}{8}$ lin. at the base, erect, rigid and very firm, glabrous and smooth on the back, loosely hairy on the face, here finely and

closely nerved, much more coarsely so on the underside, with the midrib slightly prominent towards the base, nerves indistinctly or not at all differentiated into primary and secondary. Panicle erect, narrow, open or more or less contracted, 6-8 in. long, floribund, divided to the fourth degree; common axis somewhat slender, terete, striate, smooth, lowest internodes up to almost 1 in. long; lower primary branches divided from the base, forming more or less imperfect false whorls, the longest less than half the length of the panicle, suberect or obliquely spreading, finely filiform, striate, smooth or almost so, divided again usually from low down with the lower secondary branches up to over 1 in. long; ultimate divisions capillary, upwards rather short, contracted; pedicels unequal, 1-3 lin. long, tips minutely discoid. Spikelets broad-elliptic, minutely apiculate, $\frac{3}{4} - \frac{4}{5}$ lin. long, brownish-green, dull or here and there with a metallic lustre, pubescent. Glumes membranous, about equal and as long as or very slightly shorter than the upper floret, very shortly acuminate, at least the upper, very finely and more or less prominently nerved, lower 3-5-nerved, upper 5-nerved. Lower floret 3: valve very similar to the upper glume, but glabrous; valvule almost as long, acute with broad flaps and finely scaberulous keels; anthers \{ \lin. \long. Upper floret \(\), elliptic-oblong, acute, $\frac{2}{3}$ lin. by $\frac{1}{2}$ lin., whitish; valve and valvule thinly papery, smooth except for a few very minute acute warts in the upper part; anthers slightly shorter than in the A floret.

Lower Guinea. Belgian Congo: Kwango District; Mukulu, Vanderyst, 3185 (or 3186?)! Angola: Pungo Andongo; in damp meadows between Condo and Guisonde, Welwitsch, 7410! between Pungo Andongo and Cambambe, Welwitsch, 7422! Quibinda, Welwitsch, 7432! and without precise localities, Welwitsch, 2860! 2872! 2874! Huilla; damp pastures, Welwitsch, 2671!

14. P. juncifolium, Stapf. Perennial, cæspitose, up to over 2 ft. high, with extravaginal innovations rising close to the mother culm, cataphylls quite glabrous. Culms erect, slender, simple, terete, 1-noded, node faint, below the middle, glabrous and very smooth. Leaf-sheaths tight, firm, glabrous and smooth, striate, the bases of the lowest persistent; ligule obscure, reduced to a transverse line; blades junciform, very firm and rigid, erect, tapering to an acute point, deeply channelled with the margins touching, \frac{1}{3} to almost 1/3 lin. across, or flattened out upwards and then up to over 1 lin. wide, rarely flat all along, the basal up to over 1 ft. long, the cauline considerably shorter, glabrous, the upper (inner) side with about 1 or 2 very prominent primary lateral nerves on each side of the similar midrib, the lower side quite smooth. Panicle erect, oblong, open, but with the spikelets somewhat crowded along the branches, 5-8 in. by 1\frac{1}{2} - 4 in., divided to the third or fourth degree; common axis slender, terete; very smooth, lowest internodes 1-2 in. long; lower primary branches solitary, usually divided from the base, occasionally forming very unequal false whorls, the longest over half the length of the 13+ P. margaritiferum (chios) Robyns Isadme margaritifera Chion impt. "types" Bovone & 90. Congs Belge

13+ + P. marinqueuse Robyns type Borone 6, cited by Chris sub Dachue margaritiferd, Coago Belge.



panicle, obliquely spreading or more erect, flexuous or somewhat stiff, filiform, quite terete and smooth, divided again from low down, with the ultimate divisions rather contracted and capillary; the rather short pedicels slightly unequal and mostly $1-1\frac{1}{2}$ lin. long, their tips discoid. Spikelets elliptic-oblong, subacute, about 1 lin. long, olive- or brownish-green, here and there with a faint metallic lustre, quite glabrous. Glumes membranous, finely and here and there prominently nerved, subobtuse, the lower narrower in profile, threequarters the length of the spikelet or only slightly shorter than the spikelet, 3-nerved, upper much broader, deeply concave, 5-nerved. Lower floret o: valve very similar to the upper glume; valvule slightly shorter, keels faintly scaberulous; anthers $\frac{2}{3}$ lin. long. Upper floret \u2200eq, oblong, subacute, \u2222 lin. by \u2222 lin., whitish; valve and valvule very thinly papery, quite smooth or with a few extremely minute warts; anthers slightly smaller than in the of floret.— P. strictissimum, Rendle in Cat. Afr. Pl. Welw. ii. 180 (partly); not of Afz. ex Sw.

Lower Guinea. Belgian Congo: Stanley Pool Distr.; Kimuenza, Gillet, 1667! 1743! Angola: country of the Ganguellas and Ambuellas, Gossweiler, 4098! and without precise locality, Welwitsch, 2870!

15. P. carinifolium, Stapf. Perennial from a short premorse rhizome, 4-5 ft. high, with intravaginal innovations. Culms erect, straight and stiff, simple, terete, somewhat robust, about 6-noded, only the upper internodes exserted from the sheaths. Leaf-sheaths tight or at length involute upwards and slipping from the culm, terete, firm, glabrous except along the upper ciliate margins, striate; ligule reduced to a rim or transverse line; blades linear, the lower from a very long and gradually attenuated, the upper from an equally wide base, tapering upwards to a long fine point, up to over 1 ft. long and 3 lin. wide, suberect, rather rigid, the lower flat above the attenuated base which is more or less channelled and with narrow and upwards often recurved margins, quite glabrous, smooth except along the scabrid margins, midrib prominent below and rather stout in the lower leaves, primary lateral nerves indistinctly differentiated below, obscure like all the nerves above. Panicle oblong to ovateor lanceolate-oblong in outline, stiffly erect, 4-5 in. by 1-2 in., moderately open and loose, divided to the third or fourth degree; common axis slender, terete or subangular, smooth, lowest internodes $\frac{1}{2}$ to over 1 in. long; lower primary branches solitary, divided some distance from or at the base, in the latter case sometimes forming very unequal false whorls, the longest rarely more than half the length of the panicle, filiform, scaberulous, rather stiff and obliquely erect; secondary branchlets divided from the base with their basal divisions crowded in fascicles; ultimate divisions capillary, rather short and somewhat contracted; pedicels unequal, 1-2 lin. long, smooth upwards, tips discoid. Spikelets very broadly elliptic to rotundate in outline, obtuse, somewhat turgid, slightly over \(\frac{3}{4}\) lin. long, pale

brownish-green, quite glabrous, almost dull. Glumes membranous, finely but somewhat prominently nerved, very concave, obtuse, the lower narrow in profile, two-thirds to three-quarters the length of the spikelet, 3-nerved, upper equalling the spikelet, very broad in profile and very convex on the back, 5-nerved. Lower floret 3: valve very similar to the upper glume but narrower in profile with a less curved back; valvule very slightly shorter. Upper floret 3: elliptic in outline, obtuse, not quite 3: lin. by 3: lin., whitish; valve and valvule thinly papery, very minutely verrucose, warts pointed; anthers almost 3: lin. long.

Nile Land. Jur: Ghatta's Great Seriba, Schweinfurth, 2288!

16. P. strictissimum, Afz. ex Sw. Adnot. Bot. 4. Perennial, 1-4 ft. high, in slender scanty tufts. Culms erect, hardly geniculate, slender to moderately stout, sparingly branched, many-noded, sheathed almost all along or the upper internodes at length exserted, glabrous. Leaf-sheaths terete, rather tight, quite glabrous, smooth, prominently striate; ligule reduced to an obscure ciliolate rim; blades linear from a shortly rounded and constricted base, tapering to a slender acute point, 4-6 in. (according to Swartz up to over $1\frac{1}{2}$ ft.) by 3 lin., stiffly erect or subcreet, flat, glabrous or with a few scattered very long white hairs towards the base, smooth below, rough above and along the margins, midrib rather conspicuous downwards on the back, otherwise very slender, lateral nerves numerous, slender and close. Panicle permanently enclosed at the base in the uppermost sheath or at length shortly exserted, erect, oblong-obovate to obovate in outline, more or less open in flower, then contracted, 3 to over 6 in. long, divided to the third or sometimes fourth degree: common axis slender, terete or angular, smooth or more or less rough upwards, lowest internodes about 1 in. long; lower primary branches solitary, undivided for up to 1 in., the following divided from the base, the longest more than three-quarters the length of the panicle, finely filiform or somewhat stouter and flattened towards the base, scaberulous, ultimate divisions capillary, more or less wavy; pedicels capillary with minute discoid tips, the lateral from $\frac{1}{2}$ up to $1\frac{1}{2}$ lin. long, the terminal rarely over 3 lin. long. Spikelets plump, rotundate-elliptic in outline, shortly more or less obtuse, about \(\frac{7}{8} \) lin. long, pale olive-green, usually dull, glabrous or sparingly hairy. Glumes membranous, very concave, broad-elliptic in outline, subacute in profile, subequal (the lower very slightly shorter) with the nerves usually not prominent, lower 3-, upper 5-nerved. Lower floret 3: valve very like the upper glume, 5-nerved; valvule slightly shorter; anthers $\frac{3}{8}$ lin. long. Upper floret $\mbox{$\scriptimes}$, elliptic in outline, acute, pale, $\frac{2}{3}$ lin. long; valve and valvule thin, papery, sparingly verrucose, warts formed of ovoid acute hairs.

Upper Guinea. Sierra Leone: Mabum, Thomas, 1540! 1571! 1631! and without precise locality, Afzelius!





17. P. præaltum, Afz. ex Sw. Adnot. Bot. 5. Perennial, 1 to over 4 ft. high, in slender scanty tufts with intravaginal innovations. Culms erect, rarely slightly geniculate, slender to robust, terete, simple or more often sparingly branched with erect branches, manynoded, internodes enclosed or shortly or the uppermost very long exserted, glabrous. Leaf-sheaths terete or the longest upwards compressed and slightly keeled, rather tight, quite glabrous or ciliate upwards, rarely slightly pubescent towards the junction with the blade; ligule reduced to a membranous often obscure rim, ciliolate or more rarely ciliate; blades linear from a slightly attenuated base, tapering to an acute point, 4-10 in. by $1\frac{1}{2}$ -4 (rarely $4\frac{1}{2}$) lin., flat, rather rigid and usually suberect, quite glabrous or hairy towards the ligule, very rarely higher up, smooth below, more or less rough above and along the margins, midrib whitish, slender but conspicuous below, lateral nerves numerous, close, scarcely differentiated above. Panicle erect, oblong to broad-ovoid, widely open in flower or more or less contracted, 4-6 in. long, $1\frac{1}{2}$ -6 in. wide, divided to the third or sometimes fourth degree; common axis slender, terete or somewhat angular, smooth or more or less rough higher up, lowest internodes 1½-1 in. long; lower primary branches solitary or in scanty false whorls, if solitary then undivided only for a short distance, the following divided from the base, forming very unequal false whorls, the longest usually more than half the length of the panicle, finely filiform, scaberulous or upwards almost smooth, ultimate divisions subcapillary, more or less wavy; pedicels very unequal, the lateral from ½ to over 1 lin. long, the terminal to 3 lin. long, with minute discoid tips. Spikelets plump, rotundate-ovate or rotundate-elliptic in outline, shortly acute to subobtuse, 1 to slightly over 1 lin. long, pale green or slightly tinged with brown or purple with a metallic yellow lustre, glabrous, rarely sparingly puberulous. Glumes membranous, very concave, distinctly and often prominently nerved, broad-elliptic in outline, subacute to obtuse, the lower two-thirds to four-fifths the length of the spikelet, 3-nerved, the upper more or less equalling the spikelet, 5-nerved. Lower floret of: valve very like the upper glume, 5-nerved; valvule slightly shorter; anthers $\frac{3}{4}$ lin. long. Upper floret $\mbox{$\mbox{$\scientiskip}$}$, elliptic in outline, acute, pale, \(\frac{4}{5}\) lin. long; valve and valvule thinly papery, sparingly verrucose, warts formed of ovoid acute hairs; anthers ½ lin. long; mature grain unknown.—Durand & Schinz, Consp. Fl. Afr. v. 768. P. Baumannii, K. Schum. in Engl. Jahrb. xxiv. 331.

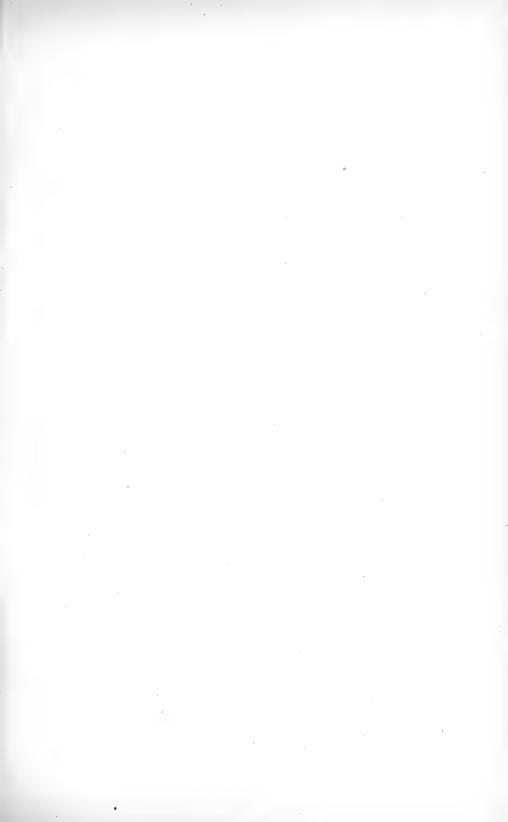
Upper Guinea. Sierra Leone: Mabum, Thomas, 1669! Binkolo, 570 ft., Thomas, 1878! Yabaya, 1200 ft., Thomas, 2284! and without precise locality, Afzelius! French Guinea: Fouta Jallon; Kouria, Caille (Herb. Chevalier, 19010)! between Kouria and Trebeleya, Chevalier, 18229! Togo, Baumann, 354! Northern Nigeria: Lokoja, Macleod, 17!

18. P. subrepandum, Rendle in Cat. Afr. Pl. Welw. ii. 178. Perennial, over 2 ft. high. Culms suberect or geniculately ascending,

slender, branched from the lowest and sometimes one or the other of the upper nodes, terete, glabrous, about 5-noded, lower internodes shortly, upper long-exserted. Leaf-sheaths terete, frequently rather loose, quite glabrous except along the ciliolate upper margins, very smooth, prominently striate; ligule a ciliolate transverse rim; blades narrowly linear from an equally wide base, tapering to a fine blunt point, 3-7 in. by $1\frac{1}{3}$ -2 lin., flat or more often tightly convolute, rather rigid and firm, quite glabrous and smooth except on the scaberulous margins and sometimes the upper side, midrib very slender, more or less prominent below, lateral nerves numerous, close, hardly differentiated. Panicles erect and open, and rhomboidal or ovate in outline, or slightly nodding and subsecund, very long-exserted, 3-4 in. by $\frac{3}{4}$ -2 in., divided up to the third degree; common axis very slender, terete, smooth, finely striate, lowest internodes $\frac{3}{4}$ —1 lin. long; lower primary branches mostly solitary and undivided for 4-10 lin. from the base or sometimes divided at the base and 2-nate, the lowest internode but one usually 6-3 lin. long, the following much shorter, longest branches about half the length of the panicle, all finely filiform like all the other divisions, often coloured and very slightly scaberulous or smooth; ultimate divisions subcapillary, short, rather contracted; pedicels unequal, $\frac{3}{4}-1\frac{1}{2}$ lin. long, tips discoid. Spikelets plump, subglobose, obtuse or subacute, over 1 to $1\frac{1}{3}$ lin. long, pale green or straw-coloured, slightly variegated with purple (particularly at the tips and edges of the glumes) here and there with a metallic lustre. Glumes membranous, very concave, minutely acute, prominently nerved, the lower two-thirds the length of the spikelet, 3-nerved, the upper as long as the spikelet, 5-nerved. Lower floret of; valve very like the upper glume; valvule slightly shorter, keels almost smooth. Upper floret \(\xi\), obovate-elliptic in outline, subacute, $\frac{4}{5}$ -1 lin. by $\frac{2}{5}$ lin.; valve and valvule thinly papery, faintly purplish or whitish, verrucose, warts more or less depressed, globular.

Lower Guinea. Angola: Huilla; in bush near Monino, Welwitsch, 2686! Mozambique Distr. North Rhodesia: near Mumbwa (15° S., 28° E.), Mrs. Macaulay, 40! Umtali, Sawer, 14!

19 P. fulgens, Stapf. Perennial, up to 2 ft. high, forming large easily disintegrating tufts; innovation-buds small, compressed, ovate in outline with short acute glabrous cataphylls. Culms erect or more or less geniculately ascending, simple or branched below, very slender, wiry below, rooting from the lowest nodes, terete, glabrous, many-noded, nodes exserted (except sometimes the lower). Leaf-sheaths tight, terete, quite glabrous and smooth or ciliate towards the mouth, finely and prominently striate; ligule reduced to a narrow membranous ciliolate rim; blades narrowly linear from an equally wide base, long-attenuated to a sharp point, 2–5 in. by 1–1½ lin., suberect, somewhat rigid, flat or more or less involute,



-19 syn Isachue kidumaensis Vandery, fide Ach.

19+ P. fulgeno r. pulesceno Kolyns
sphels more or less probescent

green, quite glabrous except for some long hairs behind the ligule or more or less loosely hairy above or on both sides, midrib very slender, lateral nerves numerous, close, not differentiated, margins smooth or nearly so. Panicle erect, ultimately long-exserted from the uppermost sheath, loose and open, $2\frac{1}{2}$ -5 in. by $1-1\frac{1}{2}$ in. or more or less contracted, divided to the third or fourth degree; common axis terete, slender, smooth, lowest internodes $\frac{1}{2}$ in. long or irregularly longer and shorter; lowest primary branches divided from the base (sometimes the lowest branchlets arrested), forming very unequal fascicles or false whorls, like the following obliquely erect, the longest up to half the length of the panicle, finely filiform, slightly rough or almost smooth; ultimate divisions subcapillary, rather contracted; pedicels usually moderately unequal, the lateral $\frac{1}{2}-1\frac{1}{2}$ lin., the terminal 2 (sometimes 3) lin. long, tips minutely discoid. Spikelets very turgid, ovate- or elliptic-rotundate in outline, obtuse, ³/₄ to almost 1 lin. long, pale olive-green with a very marked bronzy lustre, quite glabrous. Glumes thinly membranous, very concave, obtuse, unequal, the lower narrow, half to three-quarters the length of the spikelet, faintly 3-nerved, the upper much broader, semielliptic in profile, as long as the spikelet, finely and prominently Lower floret 3: valve very similar to the upper glume; valvule slightly shorter; anthers up to \(\frac{3}{4}\) lin. long. Upper floret \(\frac{1}{2}\), elliptic in outline, subacute, ½ lin. long; valve and valvules thinly papery, minutely verrucose, whitish; anthers 3 lin. long.

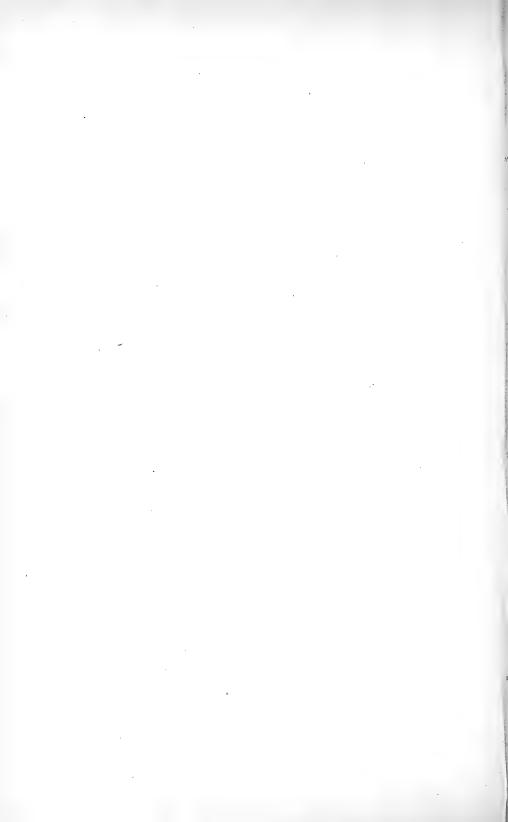
Upper Guinea. Southern Nigeria: Lagos, by water, MacGregor. 166!
Nile Land. Uganda: hillsides near Kipayo, 4000 ft., Dummer, 593! Horma
Road, Fyffe, 159! and without precise locality, Maitland, 48, AB!
Lower Guinea. French Congo: dry land near Niouwana, Lecomte, C. 23!
Belgian Congo: Stanley Pool Distr.; Kisantu, Gillet, 478!, 659!

20. P. nervatum, Stapf. Perennial, about 2 ft. high, scantily tufted. Culms erect from a geniculately ascending base, very slender, simple, 5-8-noded, with the lower nodes shortly and the upper longexserted, smooth and glabrous. Leaf-sheaths tight, terete, quite glabrous, rather thin, prominently striate; ligule a membranous ciliolate rim, up to 1 lin. high; blades linear from an equally wide base, long-tapering to a slender point, 2-3 in. by $1-1\frac{1}{2}$ lin., flat, flaccid, spreading, quite glabrous or delicately and very sparingly hairy below, more or less rough on the upper face and margins, midrib very slender, whitish below, lateral primary nerves 2 or 3 on each side, differentiated only below. Panicle at length longexserted, narrow or more or less effuse, 3-5 in. long, somewhat sparingly and very loosely divided up to the third degree; common axis filiform, striate, smooth, lower internodes $\frac{2}{3} - \frac{4}{5}$ in. long; lower primary branches usually with a long fine branchlet from the base or near it, then bare for $1-\frac{1}{2}$ in., then more closely divided, finely filiform, usually almost smooth, rarely rough; ultimate divisions scanty, capillary, flexuous; pedicels unequal, 1-3 lin. long, with very minute subdiscoid tips. Spikelets elliptic, rotundate in outline, often minutely apiculate, $\frac{3}{4}$ lin. long, pale dull green or faintly tinted with brown, pubescent. Glumes thinly membranous, very finely and more or less prominently nerved, equal or subequal and almost as long as the lower floret, minutely apiculate, the lower 3-nerved, the upper 5-nerved, hairs of the latter tubercle-based. Lower floret 3; valve very like the upper glume, but quite glabrous; valvule slightly shorter with scaberulous keels; anthers $\frac{3}{8}$ lin. long. Upper floret 4, broad-elliptic in outline, subacute, over $\frac{1}{2}$ lin. by almost $\frac{3}{8}$ lin.; valve and valvule thinly papery, brownish-white, minutely verrucose all over; anthers slightly smaller than in the 3 floret.—Isachne nervata, Franch. Contrib. Fl. Congo Franç. 32 (in Bull. Soc. Hist. Nat. Autun, viii. 331).

Lower Guinea. French Congo: plains of M'pila near Brazzaville, *Thollon*, 390! Belgian Congo: Stanley Pool Distr.; Dima, *Vanderyst*, 5106! Wombali, *Vanderyst*, 4482!

21. P. pubiglume, Stapf in Cheval. Sudania, 17 (name). Perennial (according to Barter), up to 4 ft. high. Culms erect or ascending, much branched below, with the branches in erect fascicles, slender, glabrous, many-noded, lower nodes not or only shortly exserted. Leaf-sheaths tight, terete, quite glabrous and smooth or ciliolate towards the mouth, prominently striate; ligule reduced to a narrow membranous ciliolate rim; blades linear from an equally wide base, long-attenuated to a long subulate point, 2-4 in. by $1-1\frac{1}{2}$ lin., suberect, rigid, flat or more or less involute, green, glabrous below, loosely hairy above, at least downwards, midrib very slender, lateral primary nerves 2-3 on each side, margins rough. Panicle erect, somewhat stiff, more or less exserted from the uppermost sheath, $2\frac{1}{2}$ -6 in. by 1-2 in., loose, divided to the third or fourth degree; common axis slender, terete, smooth; lowest internodes $1-\frac{1}{2}$ (rarely $1\frac{1}{2}$) in. long; lowest primary branches divided from or near the base forming very unequal false whorls, like the following obliquely erect and stiff, equalling half or three-quarters the length of the panicle, finely filiform, smooth or here and there slightly rough; ultimate divisions finely capillary, more or less wavy, usually quite smooth, obliquely spreading; pedicels unequal, the lateral up to 1 lin., the terminal up to 2½ lin. long, tips minutely discoid. rotundate-obovate or suborbicular in outline, $\frac{1}{2}$ to almost $\frac{3}{4}$ lin. long, somewhat turgid, pale green or faintly tinged with brown, more or less dull. Glumes thinly membranous, obliquely ovate-oblong in profile, subacute to obtuse, loosely pubescent, distinctly and finely nerved, the lower four-fifths the length of the spikelet and 3-nerved, the upper equalling the spikelet, and 5-nerved. Lower floret 3; valve very like the upper glume, but glabrous; valvule slightly shorter; anthers $\frac{1}{2}$ lin. long. Upper floret \heartsuit , elliptic in outline, subobtuse, 1 lin. long; valve and valvule thinly papery, whitish or ultimately

= 20 apr. Isachne wombaliensis Vandery file Rob



pale brown, very minutely and sparingly verrucose at least upwards; anthers slightly smaller than in the δ floret.

Upper Guinea. French Sudan: Sikasso, Chevalier, 805! Northern Nigeria: Nupe, in swamps, Barter, 1013! in bush near Abinsi, Dalziel, 899! Baro, Parsons, 13! Lokoja, Richardson!

113

22. P. plagianthum, Stapf. Perennial, up to 2 ft. high; innovations intravaginal. Culms geniculately ascending from a branched prostrate rooting base, or subcreet, very slender, rather wiry below, many-noded, nodes exserted, quite glabrous. Leaf-sheaths tight, terete, quite glabrous except for the upwards ciliate margins, the basal more or less decaying and leaving the wiry internodes bare; ligule reduced to a very narrow membranous ciliolate rim; blades narrowly linear from an equally wide base, very gradually tapering to an acute point, 2-4 in. by up to over 1 lin., flat or more often setaceously convolute, glabrous or more or less appressedly hairy, smooth below and above, or like the margins slightly scaberulous, midrib very slender, whitish below, lateral nerves fine, not or imperfectly differentiated. Panicle shortly or laterally exserted from the uppermost sheath and often equalled or overtopped by the blade, narrow, 2-3 in. long, contracted (permanently?), divided up to the third degree; common axis very slender, striate, smooth, lower internodes up to 1½ in. long; lower primary branches divided from low down, emerging with their lowest branchlets in fascicles from the sheath, finely filiform, angular and slightly rough; ultimate divisions subcapillary, flexuous; pedicels unequal, the lateral about ½ lin. long, the terminal 2 lin. long, with minute subdiscoid tips. Spikelets ovate- to lanceolate-oblong, acute, \(\frac{4}{5}\) lin. long, green, here and there with a faint metallic lustre, glabrous. Glumes thinly membranous, finely nerved, obliquely lanceolate in profile, acute or apiculate, the lower about three-quarters the length of the spikelet and 3-nerved, the upper equalling the spikelet and 5-nerved. Lower floret 3; valve very similar to the upper glume; valvule shorter by a quarter, subacute; anthers \(\frac{2}{5}\) lin. long. Upper floret \(\tilde{\zeta}\), elliptic-oblong, subacute, up to over $\frac{1}{2}$ lin. long; valve and valvule very thinly papery, very minutely verrucose; anthers as in the of floret.

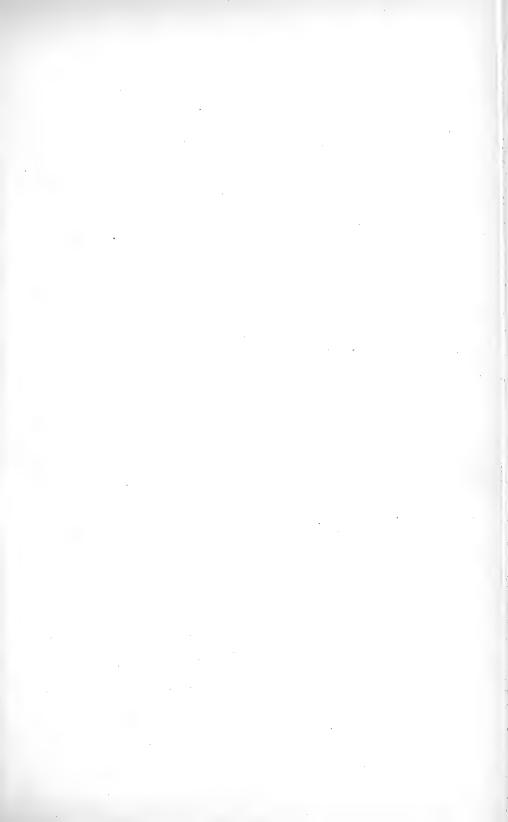
Lower Guinea. French Congo: Loango, Lecomte, D. 44! Belgian Congo: Cataracts Distr.; in sand by the roadside, near Lutete, 2000 ft., Hens, A. 245!

23. P. sublætum, Stapf. Annual, up to $1\frac{1}{2}$ ft. high. Culms erect or suberect, slender, terete, simple or branched below, 4–7-noded, nodes exserted, glabrous. Leaf-sheaths terete, tight or those supporting the branches loosened and more or less thrown aside, quite glabrous and smooth or softly and sparingly hairy and ciliate upwards; ligules very short, hyaline, long-ciliate; blades linear from a rounded to subcordate base, long-acuminate, 2–4 in. by $2\frac{1}{2}-4\frac{1}{2}$ lin., the lowest much smaller, spreading, firm but thin or somewhat

flaccid, quite glabrous or more or less finely and softly hairy, smooth or slightly rough on the upper side, margins scaberulous, midrib very fine, usually distinct and whitish below, lateral nerves numerous, very fine, not differentiated. Panicle erect, rotundate-ovate to obovate in outline, loose and open, 3-8 in. by 1-4 in., divided to the third or fourth degree; common axis terete, smooth, lowest internodes $1-\frac{1}{2}$ in. long or irregularly shorter and longer; lower primary branches solitary and divided from low down or like the following divided from the base, forming imperfect false whorls, the longest equalling three-quarters or more of the panicle, finely filiform to capillary, scaberulous; ultimate divisions delicately capillary, wavy or flexuous, all these divisions frequently with a flush of pale purple; pedicels unequal, the lateral 1 lin. long, the terminal up to over 3 lin. long, with very minute discoid tips. Spikelets ovate to elliptic-oblong in outline, subacute, about 1 lin. long, pale to bright green or faintly tinged with purple or brown, here and there with a slightly silky lustre, but on the whole dull, glabrous. Glumes very thinly membranous, finely nerved, rather concave, obliquely ovate, oblong or oblong-lanceolate in profile, subacute to acute, the lower over three-quarters the length of the spikelet, 3-nerved, the upper equalling the spikelet, 5-nerved. Lower floret &; valve very like the upper glume but less acute to obtuse, 5-nerved; valvule slightly Upper floret \lozenge , elliptic-oblong, obtuse, up to $\frac{2}{3}$ lin. long: valve and valvule thinly papery, almost transparent, minutely verrucose; anthers \(\frac{2}{3}\) lin. long.\(\frac{1}{2}P\). lætum, Stapf in Johnston, Liberia, ii. 666; Pobéguin, Ess. Fl. Guin. Franç. 215; not of Kunth.

Upper Guinea. Sierra Leone: Kenmensi, Thomas, 7642! and without precise locality, Reade! French Guinea: Kouroussa, Pobéguin, 523! common on dry ground and on cultivated land in the Bafing valley, Pobéguin, 1723! 1822! Liberia: about 70 miles up the St. Paul's River, Reynolds! Northern Nigeria: waste places near Abinsi, Dalziel, 892!

24. P. gracilicaule, Rendle in Cat. Afr. Pl. Welw. ii. 179. Annual, up to over 1 ft. high, in small tufts. Culms geniculately ascending or sometimes with a decumbent base, with flowering branches up to the middle, about 4-noded, internodes exserted or laid bare by the slipping off of the sheaths, glabrous. Leaf-sheaths terete, rather loose except the uppermost, quite smooth or ciliate upwards: ligules very short, hyaline, ciliate; blades linear from a slightly rounded base, tapering to a slender point, $2-2\frac{1}{2}$ in. by $2-2\frac{1}{2}$ lin., flat, spreading or deflexed, thin, soft, drying yellowish, glabrous or minutely and scantily hairy, midrib very slender, lateral nerves faint, margins minutely scaberulous, sometimes slightly crisp. Panicles terminal and lateral, the terminal long (up to 3 or 4 in.), exserted, broadly rhomboid or ovate in outline, up to 3 in. by $2\frac{1}{2}$ in., very loose, divided to the third degree; common axis terete or angular downwards, smooth, lowest internodes short, the next up to over in, long, the following gradually or irregularly decreasing; lower



24+ P. membranaceum Robyns Congo Beige primary branches 1-2 in. long, divided from low down (occasionally undivided for $\frac{1}{2}$ -1 in.), the following from the base, very finely filiform to subcapillary, smooth; ultimate divisions capillary, wavy; pedicels unequal, the lateral 1-2 lin. long, the terminal slightly longer, with minute discoid tips. Spikelets ovate-elliptic, acute to subacute, 1 lin. long, dull, pale green or slightly tinged with brown, glabrous. Glumes very thinly membranous, faintly nerved, rather concave, obliquely oblong to (the lower) lanceolate in profile, the lower over three-quarters the length of the spikelet, 3-nerved, the upper subequal to the spikelet, 5-nerved. Lower floret &: valve very like the upper glume but less acute, 5-nerved; valvule slightly shorter. Upper floret $\noinde{\noinde$ thinly papery, verruculose, turning fuscous when mature, with the warts showing like white pearls; anthers \frac{2}{3} lin. long. Grain pale brown, $\frac{1}{2}$ lin. by $\frac{1}{3}$ lin.; embryo much less than half the length of the grain.

Lower Guinea. Angola: Pungo Andongo; without precise locality, Welwitsch, 2857! 2862 c! Huilla; in meadows near Humpata, Welwitsch, 2687! Mozambique Distr. Nyasaland: Shire Highlands, Adamson, 279!

25. P. lindleyanum, Nees ex Steud. Syn. Pl. Glum. i. 91. Annual, from a few inches to over 3 ft. high, in scanty tufts. Culms erect, branched below, all the branches (which are mostly short) flowering. slender, terete, 3-7-noded, in tall specimens the upper internodes very long and long-exserted, glabrous. Leaf-sheaths tight or the lower loose, terete to subterete, glabrous, prominently striate; ligules hyaline, truncate, up to \frac{1}{2} lin. long; blades linear from an equally wide base, tapering to an acute point, $1-2\frac{1}{2}$ in. by $\frac{3}{4}-1\frac{1}{2}$ lin., flat, flaccid, green, loosely and often sparingly hairy, more or less rough above and along the margins, midrib very slender, but quite distinct below, whitish, raised, primary lateral nerves very fine, 2 on each side below, not differentiated above. Panicle erect. obovate to ovate in outline, open and loose, up to over 3 in. by 2 in., divided to the third or fourth degree; common axis filiform, terete, smooth, lowest internodes $\frac{3}{4} - \frac{1}{2}$ in. long; lower and intermediate primary branches divided from the base or very near it, but very rarely forming false whorls, finely filiform, obliquely erect, flexuous or rather stiff, scaberulous, the longest about two-thirds the length of the panicle; ultimate divisions capillary, obliquely spreading, more or less flexuous; pedicels unequal, 1-3 lin. long, smooth upwards, tips minutely discoid. Spikelets broad- or rotundateelliptic in outline, subacute, $\frac{2}{3}$ lin. long, pale green, more or less shortly pubescent. Glumes very thin, similar, obliquely ovate or ovate-oblong in profile, mostly unequal, almost as long as the spikelet, or the lower slightly but distinctly shorter, subacute, 3- and 5-nerved respectively. Lower floret 3; valve very similar to the upper glume but glabrous; valvule slightly shorter; anthers \frac{1}{9} mm. long.

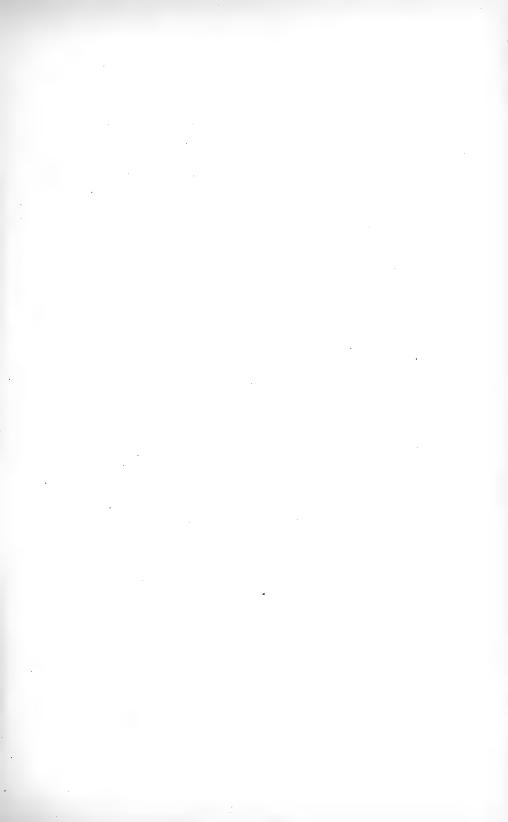
Upper floret $\noinder \$, elliptic in outline, obtuse, $\frac{2}{5}$ — $\frac{1}{2}$ lin. long; valve and valvule thinly papery, whitish or ultimately turning brownish, conspicuously verrucose, warts milk-white.—Durand & Schinz, Consp. Fl. Afr. v. 753. $\noinder P$. drosocarpum, Stapf in Journ. de Bot. 1905, 104; Pobéguin, Ess. Fl. Guin. Franç., 215. P. hystrix, Cheval. Sudania, 32; not of Steud.

Upper Guinea. Sierra Leone: Sherbro Island, dry roadsides, *Hunter*, 15! and without precise locality (*Herb. Lindley*, collector?). French Guinea: Kouroussa, *Pobéguin*. 541! Mande country; Koulikoro, *Chevalier*, 2178!

26. P. hystrix, Steud. Syn. Pl. Glum. i. 95. Annual (? — base unknown), up to over 1 ft. high. Culms erect or slightly geniculate, sparingly branched, all the branches flowering, slender, terete, up to 5-noded, nodes exserted. Leaf-sheaths tight or the lower loose, rather thin, glabrous or ciliolate towards the mouth: ligules up to ½ lin. long, hyaline, truncate, ciliolate; blades linear from an equally wide base, long-tapering to an acute point, 1-3 by 1-1½ lin., flat, flaccid, green, loosely hairy, more or less rough above and along the margins, midrib very slender, primary lateral nerves 2-3 on each side, differentiated below. Panicle erect, more or less ovoid, open and loose, up to 4 in. by 3 in., divided to the third or fourth degree; common axis filiform, terete, smooth, lowest internodes up to 5-9 lin. long; lower primary branches divided from the base, but not forming false whorls, finely filiform, obliquely erect, flexuous, smooth, the longest two-thirds to three-quarters the length of the panicle; ultimate divisions capillary, spreading, flexuous or wavy; pedicels unequal, from 1 lin. (lower lateral) to 4 lin. long, tips minutely discoid. Spikelets ovoid-elliptic to broad-elliptic in outline, obtuse to subacute, $\frac{3}{4}$ lin. long, pale green or greyish-green, copiously pubescent with spreading hairs, \frac{1}{3} lin. long. Glumes very thin, similar and subequal (or the lower slightly shorter), almost as long as the upper floret, subobtuse, the lower 3-, the upper 5-nerved, the latter more hairy with the hairs tubercle-based. Lower floret 3: valve very similar to the upper glume, but glabrous; valvule slightly shorter, subobtuse with smooth or obscurely scaberulous keels; anthers over Upper floret \(\times\), ovate-elliptic in outline, subacute, almost \frac{1}{2} lin. long; valve and valvule thinly papery, whitish, more or less glossy and smooth or with a few very minute wartlets.—Jardin, Aperçu Fl. Gabon, 15; Durand & Schinz, Consp. Fl. Afr. v. 767.

Upper Guinea. Portuguese Guinea : Loss Island, Jardin ! Senegambia : without precise locality, Heudelot, 583!

27. P. viciniflorum, Stapf. Annual (?), up to 3 ft. high, base unknown. Culms geniculately ascending, slender, weak, terete, simple, the upper part as far as seen 4-noded, nodes exserted. Leaf-sheaths terete, moderately tight, quite glabrous and smooth; ligules delicately hyaline, truncate, up to over $\frac{1}{2}$ lin. long; blades linear from a suddenly and slightly constricted base, tapering to a fine point,



)

up to 5 in. by 2 lin., flat, thin, sometimes flaccid, mostly subcrect, quite glabrous or with some very fine and soft long hairs on the upper surface particularly towards the base, smooth below, very slightly rough above and along the margins, midrib very fine, whitish below, primary lateral nerves 3 on each side, like the secondary very fine. Panicle erect, oblong to obovoid, up to 5 in. by 2 in., loose and open or more or less contracted, divided up to the third degree; common axis terete, very slender, smooth, lowest internodes 1-\frac{1}{2} in. long; primary branches finely filiform, scabrid, divided from the base or nearly so, the longest up to $2\frac{1}{2}$ in. long, the lowest secondary branches rather short, hence not producing the appearance of false whorls; ultimate divisions capillary, wavy, more or less contracted, scaberulous; pedicels on the whole not strikingly unequal, 1-2 lin. long. Spikelets broadly elliptic in outline, obtuse except when quite young, $\frac{7}{8}$ lin. long, pale green, loosely pubescent, dull. Glumes thinly membranous, very finely and somewhat prominently nerved, very concave, subobtuse, equalling the spikelets or the lower slightly shorter; the latter 3-, the upper 5-nerved. Lower floret 3: valve very like the upper glume, but glabrous; valvule somewhat shorter; anthers ½ lin. long. Upper floret ½, obliquely elliptic-rotundate in back view, subobtuse, over ½ lin. long; valve and valvule thinly papery, minutely verrucose; anthers $\frac{4}{5}$ lin. long. Grain unknown.

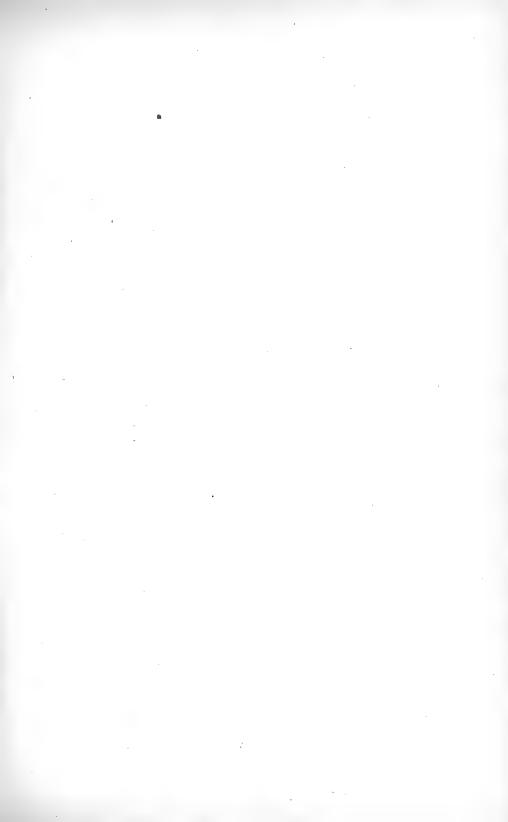
Upper Guinea. French Sudan: dry ground near Segu, Lécard, 250! The grains are eagerly sought for by birds (Lécard).

28. P. filicaule, Stapf. Annual, up to 1 ft. high, very delicate. Culms erect, finely filiform, terete, simple or more often with a short flowering branch from the last node but one, 4-5-noded, uppermost internode much exceeding the others taken together and very longexserted, lowest short, but also exserted. Leaf-sheaths tight or at length loosened, thin, glabrous or sparingly hairy; ligules hyaline, truncate, ciliolate, up to $\frac{1}{4}$ lin. long: blades linear, acute, up to $\frac{3}{4}$ in. by $1\frac{3}{4}$ lin. (sometimes much smaller), flat, thin and flaccid, green, loosely hairy all over or only towards the base and particularly behind the ligule, midrib and lateral nerves very fine, hardly differentiated, margins scaberulous upwards. Panicle oblong to ovate in outline, 2-3 in. by $\frac{1}{2}$ -1 in., open and very loose, very delicate in all parts, divided to the third degree; common axis finely filiform. terete, smooth, lowest internodes 4-3 lin. long; primary branches solitary, lower and intermediate sparingly divided from 1-2 lin. above the base, the longest $1-1\frac{1}{4}$ in. long, all obliquely erect, capillary, flexuous, minutely scaberulous; ultimate divisions very delicate; pedicels 3-6 lin. long, smooth upwards, with minutely discoid tips. Spikelets ovate in outline, acute, $\frac{3}{4}$ lin. long, pale, variegated with purple or brown, glabrous or very sparingly pubescent. Glumes very thin, lanceolate in profile, acute, very faintly nerved, unequal; lower acute, half the length of the spikelet, narrow, 3-nerved, upper

acuminate, equalling the spikelet, broad-lanceolate in profile and very concave, 5-nerved. Lower floret \circlearrowleft : valve very similar to the upper glume, but always glabrous; valvule slightly shorter; anthers $\frac{4}{5}$ lin. long. Upper floret \circlearrowleft , elliptic in outline, obtuse, almost $\frac{1}{2}$ lin. by $\frac{1}{4}$ lin.; valve and valvule thinly papery, obscurely verruculose or asperulous.

Upper Guinea. French Guinea: Fouta Jallon, between Memon and Trebeleyia, Chevalier, 8622 bis!

V. Hiantes-29. P. Hanningtonii, Stapf. Base unknown. Culms terete, strongly striate, finely hirsute below the panicle, very sparingly so below the uppermost leaf, hairs very fine, 1½ lin. long, spreading, springing from minute tubercles. Leaf-sheaths (uppermost leaves) somewhat tight, $3-3\frac{1}{2}$ in. long, subherbaceous, finely and closely striate, hirsute, hairs like those of the culms, but slightly coarser; ligule reduced to a narrow ciliate rim; blades linear from a slightly rounded semi-amplexicaul base, long-tapering to an acute point, up to 1 ft. by $3\frac{1}{2}-4\frac{1}{2}$ lin., equalling or exceeding the panicle, flat, green or tinged with purple, ciliate near the base, otherwise very loosely and finely hairy (hairs long) or glabrous upwards, margins scabrid, midrib and primary lateral nerves slender, the latter quite distinct, about 4 on each side. Panicle oblong, 9-10 in. by up to 4 in., somewhat contracted (always?), divided to the fourth or fifth common axis and primary branches loosely and finely hirsute towards the base, otherwise glabrous and scabrid along the slender ribs or angles like the finely filiform and often purplish divisions of a higher order; primary branches 2-3-nate or pseudoverticillate, the lowest pairs of fascicles distant, the following gradually more approximate or congested towards the top, their members unequal, the longest up to over 6 in. long, suberect with their tops often curving outwards, divided from low down, their divisions mostly more or less secund and dividing in a similar manner, forming very slender and loose downwards compound or simple racemes; pedicels usually longer than the spikelets, if paired often very unequal, up to over 2 lin. long, tips slightly thickened, pale. Spikelets oblong, mucronate- or rostrate-acuminate, excluding the mucro about 1 lin. long, green tinged with purple to almost entirely dull purple. Glumes unequal; lower subhyaline, ovate, acute or acuminate, with or without a minute mucro, clasping, appressed except the tip, about half the length of the spikelet, 1-nerved or with a short faint rudimentary side-nerve on each side; upper obliquely oblong in profile, finely rostrate- or subulate-acuminate, generally ending with a minute mucro as long as the spikelet, prominently 7-nerved. Lower floret 3: valve similar to the upper but shorter, broader, hardly acuminate and whitish- or yellowishgreen, often vividly contrasting with the dark purple glumes, 9-nerved; valvule subequal to the valve, acute with downwards



syn of 3. P. Zamba Vander fide Robyus
P. afrum Mez
P. proliferum v. Longipub atum Grine fide Rok.

widened flaps; anthers almost \(\frac{3}{4} \) lin. long. Upper floret \(\frac{1}{10} \), oblong, subacute, \(\frac{3}{4}\) lin. long, whitish or greyish, very glossy and smooth; valve and valvule thinly crustaceous.

Nile Land. Uganda or British East Africa: 2-7° South Lat., without precise locality, Hannington!

30. P. phragmitoides, Stapf ex Cheval. Sudania, 74, 76 (name only). Perennial, 3 to over 6 (or more?) ft. high. Innovations extravaginal with short firm brown glabrous cataphylls; rhizome short. Culms erect, terete, $1\frac{1}{2}-2\frac{1}{2}$ lin. in diam., about 4-noded, simple, glabrous. Leaf-sheaths terete, rather tight or the lower at length slipping off the stem, mostly very long (up to 1 ft.), firm, strongly striate, glabrous or more or less hirsute upwards; ligule reduced to a narrow long-ciliate rim; blades linear from an equally wide or somewhat narrowed base, long-tapering to a slender point, flat, rather firm, from 1 to almost 2 ft. long, 5-10 lin. wide, glabrous or hirsute towards the base, margins scabrid or downwards rigidly ciliate, midrib not very stout, shallowly channelled above, lateral nerves slender and close, very marked, the primary 5-9 on each side. Panicle large, loose, often over 1 ft. long, divided to the fourth or sixth degree, usually open, sometimes more or less contracted, common axis angular, strongly striate, more or less rough, glabrous, lower internodes usually 1-2 in. long; lower primary branches mostly in false whorls, up to 1 ft. long, undivided for $1-\frac{1}{4}$ in. from the base; ultimate divisions filiform, scabrid, usually slightly wavy or flexuous; pedicels very unequal, the lateral very short or more usually up to 3 lin. long, slightly thickened upwards. Spikelets oblong or oblonglanceolate and acutely acuminate at first, soon gaping, 1½ lin. long, glabrous, mostly tinged with dull purple or brown. Glumes firmly membranous, prominently nerved, lower more or less divergent, ovate, acutely acuminate to rostrate- or mucronate-acuminate, about two-thirds the length of the spikelet, 5-nerved with an upwards scaberulous keel; upper ovate in profile with a slightly recurved acute or almost beaked acumen, as long as the spikelet, mostly 7-nerved. Lower floret 3; valve very like the upper glume, but 7-9-nerved; valvule slightly shorter, oblong, acute, flaps gradually widening from the middle downwards; anthers almost 1 lin. long. Upper floret \(\xi\), elliptic-oblong, obtuse to subacute, whitish, about 1 lin. long, very smooth.—*P. coloratum*, Durand & De Wild., Mat. Fl. Congo, i. 44; Th. & Hél. Durand, Syll. Fl. Congol. 630 (partly); not of Linn. P. trypheron, var. giganteum, Rendle in Cat. Afr. Pl. Welw. ii. 181, and in Journ. Linn. Soc., Bot., xl., 230.

Upper Guinea. French Guinea: banks of Baffing river, Pobeguin, 1823! Cameroons: Yaunde station, 2600 ft., Zenker & Staudt, 462!

North Central. Middle Oubangui: Fort Possel, Chevalier, 5304! Bondjos country; Bangui, Chevalier, 5217! Upper Oubangui: Krebedje, Chevalier, 5742! and without precise locality, Viancin!

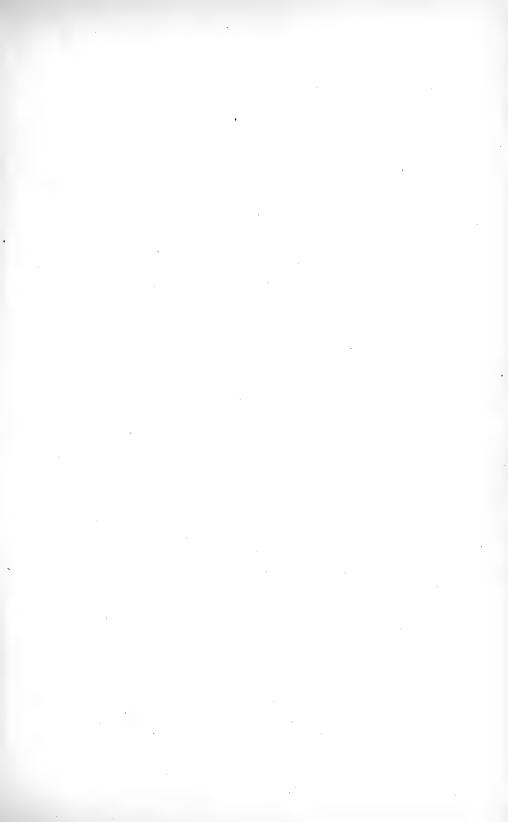
Lower Guinea. Belgian Congo: Cataracts Distr.; dry hillsides near Lutété, 1800–2000 ft., Hens, A. 245 (?), A. 279! Kwango Distr.; Bandundu, Vanderyst, 3556! Aténé, Vanderyst, 3446! Mukulu, Vanderyst, 3193! Angola: Golungo Alto; in damp thickets near Camilungo, Welwitsch, 7213! Pungo Andongo; in primæval woods near Calundo, Welwitsch, 7434! Ponte do Luiz Simões, Welwitsch, 7254!

Mozambique Distr. Nyasaland: Mount Sochi, 3000 ft., Kirk! Shire Highlands, Buchanan! Gazaland: near Chirinda, 3800 ft., Swynnerton, 1620 a!

Var. lasioneuron, Stapf; leaf-blades 10-16 in. by 5-6 lin., lateral nerves (also the secondary) more prominent, primary of both sides loosely ciliate with stiff white hairs springing from minute tubercles.

Mozambique Distr. Portuguese East Africa: Msalu river, Allen, 131!

31. P. anabaptistum, Steud. Syn. Pl. Glum. i. 75. Perennial, up to 5 ft. high, from an oblique premorse rhizome emitting very coarse root-fibres; innovations intra- and extra-vaginal, the latter rather slender, conical, almost pungent, covered with pale very firm smooth cataphylls. Culms erect or geniculately ascending, simple, terete, up to 5- or sometimes 7-noded, firm, quite glabrous and smooth. Leaf-sheaths tight, firm, usually quite glabrous and smooth, frequently slightly bearded at the mouth, rarely more or less shortly hirsute, closely striate; ligule reduced to a shortly ciliate rim; blades linear from an equally wide or slightly and gradually narrowed base, tapering to an acute point, 6-9 in. by 2-3 lin., flat, somewhat rigid, firm, usually quite glabrous except towards the ligules, rarely shortly greyish-hirsute to almost tomentose, smooth on both sides and along the margins or slightly rough along the latter owing to the presence of distant short rigid cilia, midrib distinct only in the lower part, like the very close and numerous lateral nerves slender. Panicle oblong to oblanceolate in outline, 9-12 in, long, divided to the third or fourth degree, usually somewhat contracted; common axis slender, terete, glabrous, smooth at least downwards, internodes rather unequal, the lower often up to or even over 2 in. long; primary branches usually scattered, only occasionally subopposite or pseudoverticillate, up to 6 in. long, slender, frequently flexuous, rarely undivided for more than 1 in. from the base, often branching low down; penultimate divisions usually short to very short (hence the spikelets often clustered), filiform, slightly angular and scaberulous; pedicels often paired, the secondary then very much shorter, hardly up to more than ½ lin. long. Spikelets ovate-oblong or ovatelanceolate and acutely acuminate at first, soon more or less gaping, $1\frac{1}{2}$ —2 lin. long, glabrous, pale greenish. Glumes firmly membranous, more or less prominently nerved, unequal, lower ovate-lanceolate, acutely acuminate or mucronate-acuminate, about half to over two-thirds the length of the spikelet, 5- to- sub-7-nerved, with an upwards scaberulous keel; upper ovate-lanceolate in profile, as long as the spikelet, with an usually straight (not recurved) slender subulate or mucronate acumen, 7-9-nerved. Lower floret 3: valve very like the upper glume, but usually somewhat shorter and





less acuminate, not mucronate, 7-nerved or upwards with a few fine additional nerves; valvule slightly shorter, oblong, acute, flaps equally wide or gradually widening from the middle downwards; anthers \(\frac{3}{4}\) lin. long. Upper floret \(\frac{1}{2}\), oblong, obtuse to subacute, whitish, $1\frac{1}{4}$ lin. long, very smooth; valve and valvule crustaceous.— Durand & Schinz, Consp. Fl. Afr. v. 740. P. oxyanthum, Steud. ex Steud. Syn. Pl. Glum. i. 75. P. subalbidum, Cheval. Sudania, 34 and 176; not of Kunth.

Upper Guinea. Senegambia: on the right bank of the Senegal near Richard Tol, Dollinger, 18! Walo country, Roger, 51! and without precise locality, Heudelot, 286! Leprieur. French Sudan: San, Chevalier, 2274! Macina, between Zinguetti and Sompi, Chevalier, 2285! Northern Nigeria: Nupe, in moist places, Barter, 838! Katagum District, Dalziel, 274! Sokoto, Dalziel, 480! North Central. Shari Territory: between Fort Lamy and Mandjafa, Chevalier, 10300!

According to Dalziel this is known in Northern Nigeria as "Tsuntsia" (native name for a broom, because so used), and is much planted as a field boundary in Sokoto.

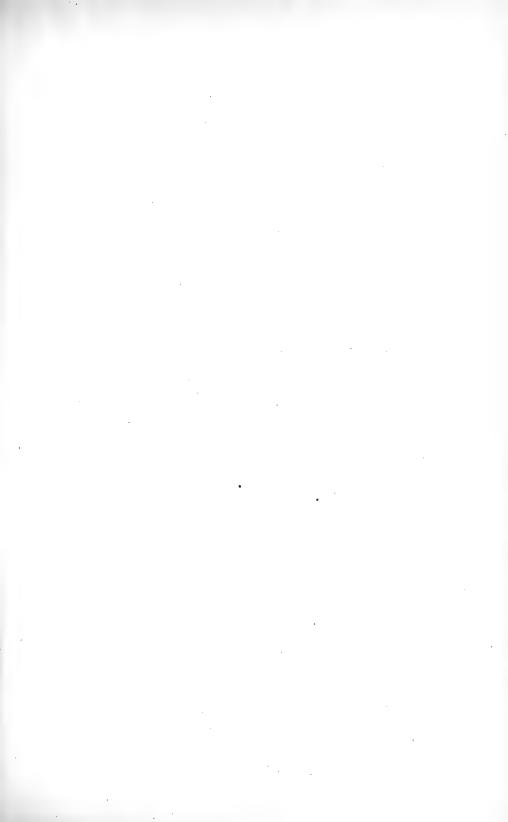
Very similar to P. phragmitoides, but distinguished by its less reed-like habit, narrower more contracted panicles, with scattered branches and more crowded heavier spikelets which have the tips or beaks of their glumes and lower valve directed forwards or very slightly inwards and not recurved. I have not seen the original of the species, but there seems no reason to doubt the identity of the specimens referred here to P. anabaptistum.

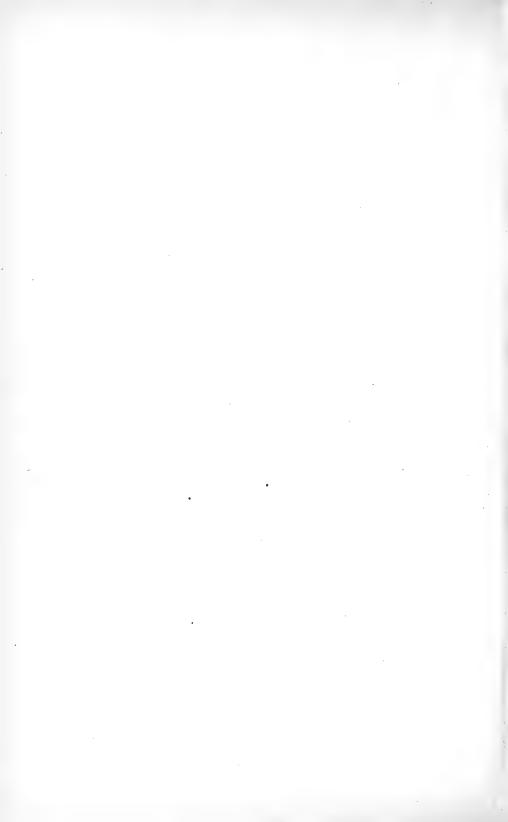
32. P. Ruspolii, Chiov. in Ann. Istit. Bot. Roma, vii. 64, t. 4. Perennial, over 2 ft. high, from a slender oblique rhizome, densely covered with tightly appressed firm glabrous cataphylls; innovations extravaginal, short, stout, glabrous. Culms terete, woody and simple below, then branching fastigiately and sometimes copiously, secondary culms (branches) 4-5-noded, pale or glaucous, very smooth, lower internodes usually elongated. Leaf-sheaths very tight, very firm, finely striate, glabrous or more or less softly hairy, particularly towards the mouth, mostly (except the uppermost) longer than the internodes; ligule reduced to a ciliate rim; blades linear from a slightly rounded or almost equally wide base, longtapering to an acute point, $\frac{1}{2}$ -1 ft. by 2-3 $\frac{1}{2}$ lin., flat or more or less involute, convolute in bud, rigid, pale to bright green, delicately loosely hairy or almost villous just above the ligule, uniformly and closely striate above, primary nerves about 3 on each side below. subdistinct. Panicle obovate or lanceolate in outline, 4-7 in. long, $1\frac{1}{2}$ in. wide, glabrous; common axis slender, terete, striate, smooth; primary branches solitary or 2-nate, rather distant, the lower 2-3 in. long, subfiliform, slightly flexuous or wavy, suberect, undivided for $1\frac{1}{2}$ in., then bearing loosely scattered racemes (secondary axes) of 3-2 spikelets closely approximate in their upper part; axes smooth downwards, otherwise finely scaberulous; pedicels solitary or 2-nate, the lateral shorter to much shorter than the spikelets, filiform. Spikelets ovate-elliptic in outline, acuminate, soon more

or less gaping, $1\frac{3}{4}-2$ lin. long, slightly turgid, pale or glaucous green, usually with deep purple tips and margins, quite glabrous and smooth. Glumes unequal, firmly membranous, mucronate (mucro $\frac{1}{2}-\frac{3}{4}$ lin. long, scaberulous), very concave; lower obliquely ovate in profile, shortly acuminate, excluding the mucro half the length of the spikelet, 3- to sub-7-nerved; upper ovate-lanceolate in profile, shortly acuminate, 7-9-nerved, as long as the spikelet. Lower floret \circlearrowleft : valve very similar to the upper glume, subacuminate, but hardly mucronate, 9-nerved; valvule oblong, acute, $1\frac{1}{2}$ lin. long, flaps much (but gradually) widened downwards; anthers deep purple, 1 lin. long. Upper floret \ncong , oblong, subacute or obtuse, $1\frac{1}{4}-1\frac{1}{2}$ lin. long: valve and valvule subcrustaceous to papery, whitish or straw-coloured, very smooth and glossy; stigmas purple, $\frac{3}{4}$ lin. long.

Nile Land. Southern Abyssinia: Surro, Riva, 66! between Adisabeba and Borana, Stordy!

33. P. massaiense, Mez in Engl. Jahrb. xxxiv., 144. Perennial, from a slender rhizome, 2 ft. high. Culms geniculately ascending, simple, 5-9-noded, slender, wiry below, terete, glabrous, internodes exserted or the lowest at length bared by the slipping off or the decay of the sheaths. Leaf-sheaths terete, tight, or at length loosened, firm, finely striate, glabrous or sparingly and finely hirsute; ligule reduced to a ciliate rim; blades linear from an equally wide or slightly rounded base, long-tapering to a slender point, up to 6 in. by 2-2\frac{1}{5} lin., green, flat, somewhat firm, glabrous and smooth or very sparingly and finely hirsute, margins finely cartilaginous, scaberulous, midrib stouter, dorsally rounded and prominent downwards, primary nerves 3-4 on each side, fine but usually distinct at least below. Panicle oblong to obovate-oblong, 3-5 in. long, somewhat contracted, divided to the fourth degree; primary axis very slender, terete, striate and smooth below, angular and scaberulous upwards; primary branches very finely filiform, scattered or variously approximate to pseudo-verticillate, the lowest 2-3 in. long, undivided to up to $1\frac{1}{2}$ in. from the base, upwards first loosely then more and more closely branched; the following divisions very fine to capillary, scaberulous, forming slender racemes which are subcompound downwards and bear 10 to few spikelets; pedicels very slightly thickened at the tips, lateral usually much shorter than the spikelets. Spikelets early and widely gaping, up to 14 lin. long, glabrous, yellowish-green. Glumes widely divergent, membranous, lower ovate, acute or shortly acuminate, appressed, one-third to not quite half the length of the spikelet, imperfectly 1-5-nerved, middle-nerve percurrent, scaberulous, the others faint and short; upper obliquely lanceolate in profile with a slender laterally compressed straight or slightly recurved beak, up to 11/4 lin. long, prominently 7-nerved. Lower floret 3: valve obliquely oblong in profile, acute, slightly shorter





than the upper glume, prominently 7-nerved; anthers not quite 1 lin. long. Upper floret \notineq , oblung, obtuse or subacute, $\frac{7}{8}$ lin. long, whitish, quite smooth, glossy; valve and valvule papery to crustaceous.

Nile Land. Uganda: grassy uplands near Bungunga, 4000 ft., Dummer, 3176! Massai Steppe, Stuhlmann, 4307.

34. P. poæoides, Stapf. Annual, tufted, up to 1 ft. high. Culms geniculately ascending, simple or sparingly branched, about 3-noded, slender, soft, hirsute, internodes hardly exserted except the uppermost, sometimes at length bared by the slipping off of the sheath. Leaf-sheaths terete, subherbaceous, finely striate, more or less softly hirsute; ligule reduced to a membranous ciliolate rim; blades linear from an equally wide or slightly rounded base, tapering to an acute point, 3-5 in. by 2-3 lin., pale or yellowish-green, flat, somewhat soft, hirsute (sometimes densely) on both sides, margins minutely scaberulous, closely and uniformly nerved above with the midrib flat and whitish, the latter very slender below and like the primary lateral nerves (3-4 on each side) distinctly raised. Panicle oblong to ovate-oblong in outline, 2-3 in. by $1-1\frac{1}{9}$ in., somewhat contracted, divided to the fourth degree; primary axis slender, terete, striate and loosely hairy below, angular and scabrid upwards; primary branches solitary or here and there approximate in pairs, the lowest 2-24 in. long, undivided for 6-7 lin. from the base, then divided with their divisions contracted and mostly short (hence the whole of the spikelets of a primary branch congested), filiform, scaberulous; all the lateral pedicels short to very short, with small subdiscoid tips. Spikelets oblong, acutely acuminate, up to 1½ lin. long, glabrous, dull green with purple or altogether dark purple. Glumes moderately divergent, membranous; lower obliquely ovate, acute or shortly and acutely acuminate, with or without a minute mucro, less than half the length of the spikelet, appressed, imperfectly 3-5-nerved, middle nerve percurrent, minutely scaberulous upwards, the others faint and short; upper obliquely lanceolate-oblong in profile, rostrate-acuminate with the slender straight or slightly curved beak laterally compressed, finely 7-nerved, as long as the spikelet. Lower floret 3: valve similar to the upper glume, but not rostrate and wider, 7-nerved; valvule slightly shorter, oblong, acute; anthers Upper floret &, oblong, subacute, 1 lin. long, about \(\frac{3}{5}\) lin. long. whitish or greyish, smooth and glossy.

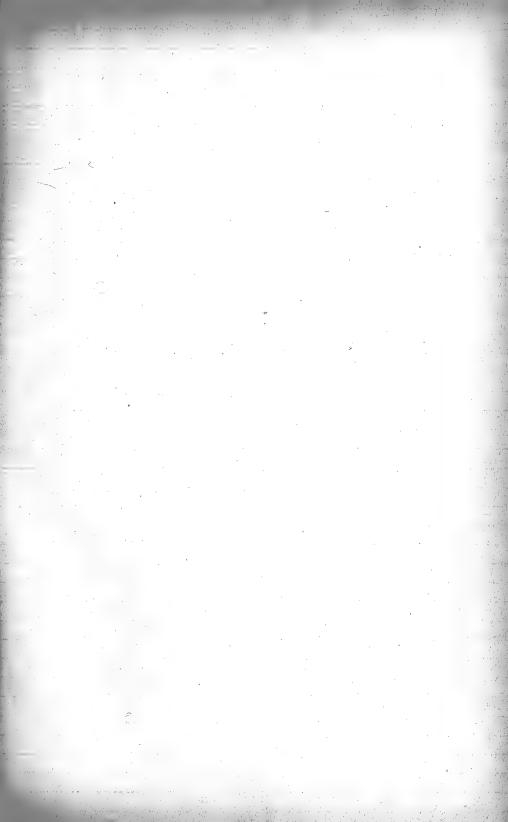
Nile Land. British East Africa: Nairobi, Linton, 213! Dowson, 256!

35. P. graniflorum, Stapf. Perennial, densely cæspitose, over 2 ft. high, with intravaginal innovations and stout root-fibres. Culms erect, very slender, terete, 3-4-noded, simple, glabrous, smooth, internodes more or less exserted, the uppermost (peduncle) at length very long and grooved. Leaf-sheaths terete, tight, quite glabrous or sparingly ciliolate or ciliate towards the mouth and

there slightly bearded, the lowest 1-2½ in, long, more or less persistent; ligule reduced to a small ciliolate rim; blades very narrow, setaceously convolute with a fine subacute point, 4-7 in. by $\frac{1}{2}$ or (when flattened out) 1 lin., rigid, glabrous or with some fine hairs towards the base, smooth except along the scaberulous margins and towards the tip, closely nerved, midrib slender, primary lateral nerves 2-3 on each side, slightly differentiated. Panicle slightly nodding, very narrow, 5-7 in. by $\frac{1}{3}$ in., contracted, divided up to the third degree, quite glabrous, all the divisions finely filiform to almost capillary and like the primary axis scaberulous; primary branches rather distant to beyond the middle and shorter or not very much longer than the internodes, then rapidly shorter and overlapping, hence the panicle subinterrupted below and rather dense upwards; pedicels slightly thickened at the tips, the lateral very short to \frac{1}{3} lin. long. Spikelets more or less gaping, \(\frac{7}{8}\) lin. long, slightly turgid, slightly variegated with purple, glabrous. Glumes similar but unequal, membranous, finely nerved; lower obliquely lanceolate in profile, acuminate, mucronulate, three-quarters the length of the spikelet, sub-5-nerved, lateral nerves short, midnerve and mucro scaberulous, tip standing off; upper obliquely oblong, acuminate, acumen involute or laterally compressed, usually very slightly recurved, nerves 5. Lower floret 3: valve very similar to the upper glume and almost or quite as long, but broader downwards and much less acuminate, 5-nerved; valvule almost as long as the valve, subacute; anthers $\frac{1}{2}$ lin. long. Upper floret $\[\]$, oblong, obtuse, $\frac{3}{4}$ lin. long, yellowishwhite, glossy and smooth.

Mozambique Distr. Portuguese East Africa : Kongone mouth of the Zambesi, Kirk (Jan., 1861)!

36. P. congoënse, Franch. Contr. Fl. Congo Franç. 34 in Bull. Soc. Hist. Nat. Autun. viii. 342. Perennial, compactly cæspitose, up to 2 ft. high with intra- and extra-vaginal innovations, covered by firm glabrous cataphylls. Culms very slender, erect, 4-6-noded, branched lower down, with the branches erect, glabrous, smooth, internodes mostly more or less exserted. Leaf-sheaths terete, very tight, firm, finely striate, glabrous and smooth, or the lowest appressedly hairy at the base; ligule reduced to a ciliate rim; blades very narrowly linear, usually setaceously convolute, tapering to a long fine point, up to 6 or 8 in. by 1 lin. (when flattened out), quite glabrous and smooth or very delicately ciliate or bearded at the base, midrib slender but distinct, lateral nerves obscure. Panicle oblong, up to 5 in. by 1½ in., loose, divided to the third degree, all the axes more or less finely filiform to capillary, rather rigid and obliquely spreading or divaricate, smooth or scaberulous upwards, and those of the first and second order often bearing downwards extremely fine spreading flexuous long white hairs; primary branches scattered or approximate in pairs, the lower 1-2 in. long, loosely divided from low down,





or the lowest undivided for up to 1 in.; pedicels hardly thickened at the tips, the lateral very short or up to over 1 lin. long. Spikelets early widely and obliquely gaping, 3-1 lin. long, glabrous, more or less variegated with purple and white. Glumes widely divergent, membranous, somewhat similar, faintly nerved with the midnerve scaberulous upwards, mostly purplish, lower lanceolate or ovatelanceolate in profile, acuminate or mucronate-acuminate, $\frac{2}{3}$ lin. long, 1- to sub-5- (mostly 3-) nerved, upper obliquely oblong or lanceolate-oblong in profile, up to 1 lin. long, acutely acuminate, 5-nerved. Lower floret as long as or slightly shorter than the upper glume, 3: valve semi-ovate in profile, subacute, 5-nerved, paler than the glumes to almost white; valvule slightly shorter, oblong, acute, flaps widening downwards; anthers almost \frac{1}{2} lin. long, dark Upper floret \mbeta , oblong, obtuse, $\frac{1}{2}$ lin. by over $\frac{1}{4}$ lin., whitish, smooth and glossy; valve and valvule papery to crustaceous.— P. mitophyllum, Pilger in Engl. Jahrb. xxxiii. 50.

Upper Guinea. Old Calabar, Robb!
Lower Guinea. Gaboon: Munda Distr.; Sibange Farm, Soyaux, 345!
and without precise locality, Griffon du Bellay! Miss Kingsley! French Congo:
savannas near N'Gore, Dybowski, 85! Niounvoux, Lecomte, C. 94! Portuguese
Congo: Vista, Chaves, 10!

37. P. vagiflorum, Stapf. Perennial, up to over 2 ft. high, compactly exspitose, with intravaginal innovations, shortly coated by the persistent sheath-bases. Culms erect or slightly geniculate, simple, about 4-noded, slender, terete, finely striate, glabrous like the whole plant. Leaf-sheaths very tight, firm, the basal short with their bases persistent, the intermediate and upper very much shorter than the internodes, all finely striate and smooth; ligule reduced to a fine ciliolate rim; blades linear from a slightly narrowed or equally wide base, long-tapering to a slightly callous point, 5 to over 6 in. by $1\frac{1}{2}$ -2 lin., rigid, flat, green, quite glabrous and smooth except at the scaberulous margins, midrib very slender, slightly prominent below, hardly differentiated from the lateral nerves above. Panicle oblong to broadly ovate or obovate in outline, 3-6 in. by 2-3 in., open and very loose, divided to the third degree; common axis very slender, striate and smooth below, angular and scaberulous upwards, quite glabrous; primary branches finely filiform, mostly scattered, more rarely approximate in pairs, rather distant, the lowest up to over 3 in. long, undivided for 4-2 lin., then very loosely or remotely and divaricately branched; branchlets almost capillary, more or less wavy, finely scaberulous, representing usually simple, very loose 4-2-spiculate racemes; pedicels unequal, mostly $1\frac{1}{2}-3\frac{1}{2}$ lin. long, hardly thickened upwards. Spikelets soon gaping, 1 lin. long, variegated, glabrous. Glumes similar, obliquely ovate to ovatelanceolate or oblong, acutely acuminate, unequal, membranous, finely 5-7-nerved, mostly purple, lower three-quarters the length of the upper, often minutely mucronulate. Lower floret of: valve

very similar and equal to the upper glume, but less acute, rather broader, paler at least downwards, 5-nerved; valvule slightly shorter, oblong, acuminate, flaps generally wider downwards. Upper floret $\mbox{\ensuremath{\notrell}}$, oblong, subacute, $\mbox{\ensuremath{\ensuremath{\cancel{3}}}}$ lin. by $\mbox{\ensuremath{\ensuremath{\cancel{3}}}}$ lin., yellowish, very glossy and smooth.

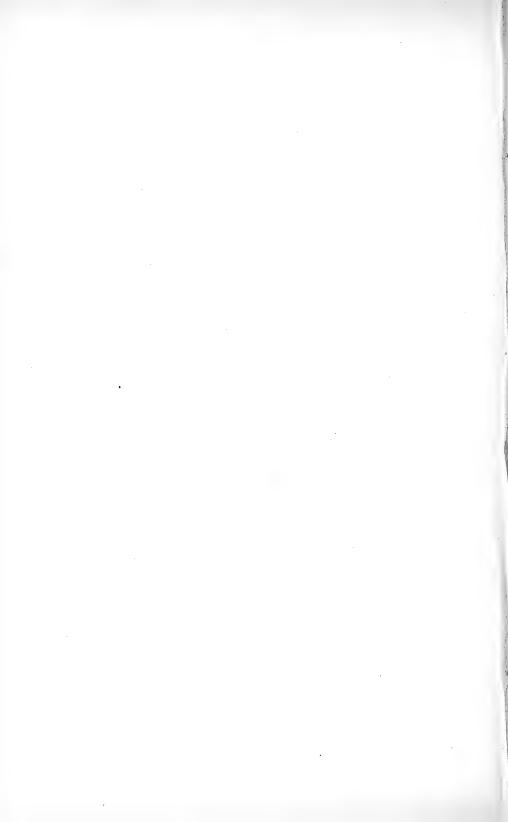
Mozambique Distr. Portuguese East Africa: Msalu river, Allen, 115!

38. P. pecilanthum, Stapf. Perennial, up to 3 ft. high, compactly cæspitose, with intravaginal innovations, coated by the persistent Culms erect, slender, simple, usually 1-noded, with sheath-bases. the node about the middle, more rarely 2-noded, terete, striate or sulcate, sparingly hairy below the node or glabrous, scaberulous. Leaf-sheaths tight, the lowest very firm and long-persistent, greyishtomentose at least upwards, often glabrescent towards the nodes, densely ciliate along the outer margin, much shorter than the internodes; ligule reduced to a brown minutely ciliolate rim; blades very narrowly linear, acute, $\frac{1}{2}$ to over 1 ft. long, $1-1\frac{1}{2}$ lin. wide, rigid, flat or particularly upwards setaceously convolute, dull green, finely and spreadingly hairy on both sides with white hairs, midrib slender, flat above, raised below, lateral nerves very close, raised. Panicle oblanceolate to obovate in outline, open and loose, 6-7 in. by 4 in., divided to the third or fourth degree; common axis slender, striate or sulcate, angular upwards, like all the divisions scaberulous, hairy at the lower nodes; primary branches filiform, obliquely spreading, usually approximate in pairs, pairs $1\frac{1}{2}$ in. distant, more rarely sub-3-nate, pseudo-verticillate or solitary, the lowest 3-4 in. long, undivided for $1\frac{1}{2}$ -1 in., the following 5-3 lin. only, then loosely divided, the fine flexuous divisions forming very slender downwards compound loose or upwards contracted racemes of about 7 or fewer spikelets; pedicels very unequal, often longer (to 2 lin.) than the spikelets, tips obscurely thickened. Spikelets oblong, acuminatesoon gaping, 1 lin. long, richly tinged with purple. Glumes membranous, finely nerved; lower obliquely ovate-lanceolate or lanceolate, acuminate in profile, appressed or spreading upwards, twothirds to three-quarters the length of the spikelet, 5-nerved; upper obliquely oblong, acuminate with a slightly blunt point, 1 lin. long, Lower floret 3: valve equal and very similar to the upper glume, if not broader; valvule subequal, oblong, minutely truncate, flaps much widened at the lower third; anthers 1 lin. long. Upper floret $\noinder \$, oblong, subobtuse, $\frac{3}{4}$ lin. long, whitish, glossy and smooth; valve and valvule thinly crustaceous.

Upper Guinea. Cameroons: without precise locality, Unwin, 9185!

39. P. dregeanum, Nees, Fl. Afr. Austr. 42. Perennial, compactly cæspitose, with a coat of persistent leaf-bases, 1–4 ft. high, with intravaginal innovations. Culms erect, slender, up to 1 lin. in diam., 1–2-noded, simple, very smooth, glabrous. Leaf-sheaths firm,





terete, tight, striate, the lowest long-persistent, appressedly silkytomentose at the base, glabrous upwards, with ciliate margins, then more or less pubescent to tomentose towards the mouth, at length often glabrescent, the upper sheath glabrous except along the margins or below the junction with the blade; ligule reduced to a ciliate rim; blades linear from an equally wide or narrowed base, tapering to a slender point, up to 9 in. long, 1-2½ lin. wide, firm and more or less rigid, sometimes flushed with red, loosely pubescent to hirsute on both sides, more densely so towards the base or densely ciliate there and otherwise glabrous, smooth except along the scaberulous margins, sometimes distinctly waxy between the nerves of the upper side, midrib very slender, lateral nerves close, fine, the primary usually hardly differentiated. Panicle oblong to ovate-oblong, erect, more or less contracted or more rarely widely open, 3-7 (rarely to 12) in. by 1½-3 in., divided to the fourth degree, quite glabrous, rarely with tufts of small hairs in the lower axils; primary axis slender, grooved below, angular upwards, scaberulous all along or smooth below; primary branches either solitary or approximate in pairs or in false whorls, the lowest $1\frac{1}{2}-3\frac{1}{2}$ or sometimes 5 in. long, undivided for a shorter or longer distance (to 1½ in.) from the base, then loosely and downwards repeatedly branched, the penultimate divisions forming loose 4-2-spiculate racemes, all the divisions increasingly fine, filiform, angular, scaberulous; pedicels with minutely subcupular tips, the lateral very short or as long as or longer than the spikelets. Spikelets more or less gaping, 1-1½ lin. long, greenish, usually tinged with purple or almost wholly deep purple, glabrous. Glumes similar and membranous; lower obliquely ovate or ovate-lanceolate in profile, acuminate, sometimes slightly mucronulate, half to three-quarters the length of the spikelet, finely 5- (rarely 7-) nerved, midnerve scaberulous upwards; upper obliquely lanceolate or lanceolate-oblong, acutely acuminate, as long as the spikelet, 5- or more often 7-nerved, nerves more prominent Lower floret 3: valve very similar to the upper and about as long, but less acuminate; valvule almost as long as the valve, oblong, acute; anthers \frac{1}{2} lin. long. Upper floret \operatorname{\text{\operatorname{o}}}, oblong, obtuse, $\frac{1}{2}$ lin. long, whitish, smooth and glossy.—Steud. Syn. Pl. Glum. i. 87; Durand & Schinz, Consp. Fl. Afr. v. 748; K. Schum. in Engl. Pfl. Ost-Afr. C. 103; Stapf in Dyer, Fl. Cap. vii. 411; Wood, Natal Pl. t. 161; Rendle in Journ. Linn. Soc., Bot., xl. 230; Eyles in Trans. R. Soc. S. Afr. v. 300. P. amethystinum, Franch. Contr. Fl. Congo Franç. in Bull. Soc. Hist. Nat. Autun. viii. 343 (35 of reprint). P. chilianthum, Stapf ex Cheval. Sudania, 62, 132.

Upper Guinea. Northern Nigeria: common in damp pastures near Abinsi, Dalziel, 897!

North Central. Shari Territory: in swamps near Ndellé, Chevalier, 8112! Nile Land. Sudan: Jur; near Ghattas' Great Seriba, Schweinfurth, 1966! British East Africa; Nairobi, Linton, 14!

Lower Guinea. French Congo: in dry plains near Brazzaville, Thollon, 389! Chevalier, 4166! Belgian Congo: Stanley Pool Distr.; Wombali, Vanderyst, 4483! Angola: Benguella; country of the Ganguellas and Ambuellas, Gossweiler, 2359!

South Central. Belgian Congo: Katanga; Elisabethville, Rogers, 10318! Mozambique Distr. Nyasaland: Tanganyika Plateau; Fort Hill, Whyte! Shire Highlands, Adamson, 194! Mayomero Mission, 3000 ft., Waller! Manganja Hills, Waller! Zomba, 2500–3500 ft., Whyte! and without precise locality, Buchanan! Northern Rhodesia: Kankasa Spruit, Kässner, 2098! near water and on swampy ground near M'rewa, Appleton, 8! 21! Mashonaland; Charter District, Mundy! Umtali, Hon. Mrs. Cecii, 273! Salisbury, 4900 ft., Eyles, 620! Stapleford Farm near Salisbury, Mrs. Craster, 77! 78! South Rhodesia: Ingesi, Nobbs, 683! Gwelbi Flat, Nobbs, 605! and without precise locality, 5200 ft., Walters, 2245! 2267! Gazaland: Nyahodi river, Swynnerton, 1669! Portuguese East Africa: in open woods near Beira, Swynnerton, 1592!

Also in the Transvaal and Natal. Said to be good fodder (Appleton).

40. P. Pilgeri, Mez in Engl. Jahrb. xxxiv. 146. Perennial, up to 4 ft. high. Culms erect, rather slender, simple, 3-noded, softly and very finely hirsute, particularly the lower internodes. Leafsheaths tight, softly and loosely or densely hirsute, up to 3 in. long, shorter than the internodes; ligules thinly membranous, up to ½ lin. long, ciliolate; blades linear from an equally wide base, longtapering to a slender point, up to 14 in. by 2 lin., flat or involute, firm, softly hirsute on both sides, midrib and primary lateral nerves about 4 on each side, slender, prominent. Panicle oblong, contracted, somewhat dense, up to 8 in. long, stiffly erect, divided up to the fourth (rarely fifth) degree, all the axes including the pedicels with long loose white hairs; primary axis slender, terete, striate or sulcate, rough; primary branches solitary or approximate in pairs or threes, branched from near the base and forming false whorls of very unequal divisions (the longest up to 4 in. long), with somewhat distant small clusters of spikelets (penultimate divisions) below the loose terminal raceme; lateral pedicels from very short to 2 lin. long, their hairs up to over 1 lin. long. Spikelets ovate, acuminate in outline, gaping, 1 lin. long, pale or tinged with purple, glabrous. Glumes similar, membranous, faintly nerved, longacuminate, the acumen passing into a fine scaberulous mucro or awnlet up to ½ lin. long; lower obliquely lanceolate or ovate-lanceolate, without the mucro or awn slightly shorter than the lower floret, prominently 3-nerved; upper broader, 5-nerved, as long as the lower floret, the mucro or awnlet shorter. Lower floret 3: valve ovate, subacute, finely 5-nerved; valvule slightly shorter, oblong, acute, flaps gradually widened downwards; anthers \frac{1}{2} \lin. Upper floret &, elliptic-oblong in outline, obtuse, \(\frac{3}{4}\) lin. long, whitish, glossy and smooth; valve and valvule crustaceous.— P. lasiopodum, Stapf in Journ. de Bot. 1905, 105; Pobéguin, Ess. Fl. Guin. Franc. 214.

Upper Guinea. French Guinea: Kouroussa, Pobéguin, 500! Northern Nigeria: Nupe; in open plains, Barter, 1377!





41. P. aphanoneurum, Stapf ex Cheval. Sudania, 32, 34, 149, 152, 180 (name). Perennial, densely exspitose, reed-like, 4-7 ft. high with intra- and extra-vaginal innovations, the latter slender and covered with smooth glabrous cataphylls. Culms erect, rather stout, to 3 lin. in diam., 4-6-noded, simple, very smooth and often glaucous below the dark nodes. Leaf-sheaths firm, terete, tight, all glabrous except at the upwards ciliolate margins and very smooth, or very rarely some of the lowest pubescent upwards, frequently flushed with purple, the basal more or less persistent: ligule reduced to a very narrow ciliolate rim; blades linear from an equally wide base, long-tapering to a slender point, $\frac{1}{2}-1\frac{1}{2}$ ft. by 2-5 lin., firm and tough, more or less rigid, dull green or flushed with red, quite glabrous except for a lateral tuft or a line of small white hairs on each side at the junction with the sheath, smooth below, rough above (at least upwards) and along the margins, midrib slender, downwards slightly prominent on the back and whitish on the face, otherwise often inconspicuous, lateral nerves close, the primary (up to 6 on each side) usually little differentiated. Panicle oblong to ovateor obovate-oblong, more or less contracted or more rarely widely open and loose, ½ to over 1 ft. by 2-5 in., divided to the fourth or fifth degree; primary axis slender, terete or grooved below, angular upwards, quite glabrous, scaberulous or scabrid all along or smooth below; primary branches either solitary and of these the lowest often much divided from the base, forming more or less dense fascicles of very unequal branchlets, or approximate in pairs or frequently in false whorls, the lowest 3-9 in. long, undivided for a short or long (to over 1 in.) distance from the base, then very loosely branched. the secondary or, in decompound panicles, the tertiary branchlets forming downwards compound or altogether simple long and loose or short and more or less dense racemes, all the divisions filiform, increasingly fine, often compressed below, angular and scabrid; pedicels with minutely discoid tips, the lateral often very short. Spikelets early and often widely gaping, $1\frac{1}{4}-1\frac{3}{8}$ lin. long, quite pale or pale with purple tips or richly tinged with purple or altogether deep purple, glabrous. Glumes similar, somewhat firmly membranous, obscurely nerved; lower obliquely ovate in profile, acuminate and more or less mucronulate, appressed except the tips, half to over three-quarters the length of the lower floret, 3-5-nerved, midnerve prominent upwards and scaberulous: upper obliquely oblong in profile, acutely acuminate with the acumen slightly recurved, as long as the spikelet, 5-nerved. Lower floret 3: valve very similar to the upper glume and equalling it or almost so. but less acuminate with the acumen straight, 5-nerved; valvule slightly shorter, oblong, acute; anthers $\frac{1}{2}$ lin. long. Upper floret $\norm{\no$ whitish, very smooth and glossy.—P. anabaptistum, Pobéguin, Ess. Fl. Guin. Franc. 214; not of Steud.

Upper Guinea. Gambia, Don (?)! French Guinea: on flooded land and auong streams in the valley of the Baffing river, Pobéguin, 1720! 1721! 1730! French Sudan: Kouroussa, Pobéguin, 493! between Nyamina and Koulikoro, Chevalier, 2272! Segu, Lécard, 251! 253 (partly)! San, Chevalier, 2273! near Mopté and Djenné, Chevalier, 2189 bis! 2190! 24950! Northern Nigeria: Katagum Distr., Dalziel, 258! Abinsi, Dalziel, 905! Nupe; in moist places, Barter, 728! near Lokoja, Dalton! Southern Nigeria: Lagos; in Ikoyi bush, Dalziel, 1328! 1330! Aboh, Barter, 343! Cross River Distr.; Ogurude, Holland, 280! along streams in the valley of the Baffing river, Pobeguin, 1720! 1721! 1730!

North Central. Shari Territory: Bahr Salamat, Chevalier, 10511! Central Shari; region of Lake Iro, Kabas-Solo, Chevalier, 8936! Koulfé, Chevalier, 8956! 9090 bis!

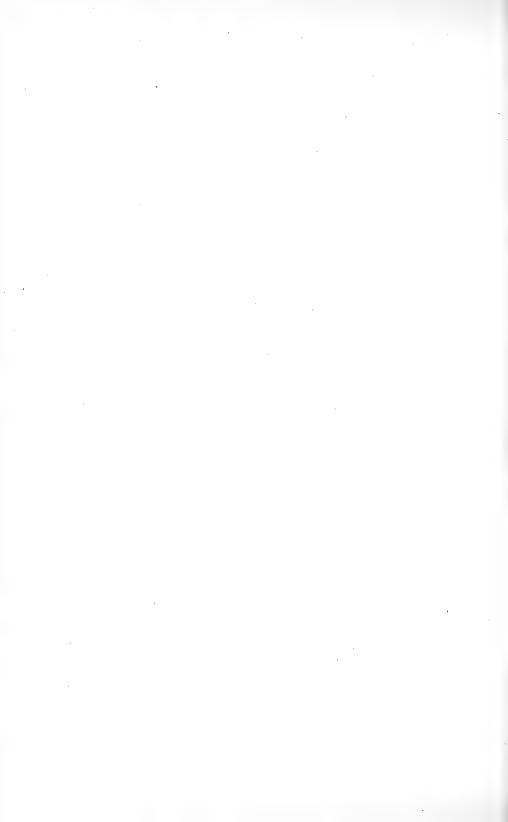
Nile Land. Bongoland: Dukutto by the Roah river, Schweinfurth, 2756! Lower Guinea. Belgian Congo: Stanley Pool Distr.; Muschie, Vanderyst, 3903! sandbanks near Chenul, Vanderyst, 5178! Kimpese, Vanderyst, 4388! Mozambique Distr. Southern Rhodesia: Victoria Falls, Rogers, 5717!

42. P. Rowlandii, Stapf. Perennial, 12-3 ft. high. Culms erect or geniculately ascending, slender, up to 9-noded, branched below or almost all along, smooth, sometimes slightly glaucous below the dark nodes. Leaf-sheaths firm, terete, tight, finely striate, all quite glabrous or minutely bearded at the mouth; ligule reduced to a narrow ciliolate rim; blades linear from an equally wide base, longtapering to a fine point, up to over 1 ft. by 1-2 lin., firm and tough, flexuous, dull green, quite glabrous, slightly rough on the margins and sometimes towards the tips, otherwise smooth on both sides, midrib slender or inconspicuous, lateral nerves close, the primary (about 3 on each side) usually little differentiated. Panicle oblong, contracted, 6-12 in. by about 2 in., divided to the fourth degree; primary axis slender, terete or grooved below, angular upwards, quite glabrous, scaberulous upwards; primary branches either solitary or approximate in pairs or false whorls, the lowest 3-6 in. long, undivided for rarely more than \frac{1}{2} in., then loosely branched or upwards more closely branched, all divisions filiform to almost capillary, scaberulous; pedicels very slightly thickened upwards, the lateral very short to 1 lin. long. Spikelets more or less gaping, from slightly over 1 to 13 lin. long, quite pale or tinged with purple, glabrous. Glumes membranous, obscurely nerved; lower obliquely ovate in profile, acute or acuminate and minutely mucronate, appressed except the tips, half to two-thirds the length of the lower floret, 5-nerved, midnerve prominent upwards and scaberulous; upper obliquely oblong in profile, acuminate, with the acumen hardly recurved, 5- to sub-7-nerved. Lower floret 3: valve very similar to the upper glume and about as long, . 5-nerved; valvule slightly shorter than the valve; anthers \frac{2}{3} lin. Upper floret \S , elliptic, oblong, obtuse, $1\frac{1}{3}$ lin. long, glossy and smooth, valve and valvule subcrustaceous.

Upper Guinea. Southern Nigeria: near Lagos, Rowland! at the edge of a marsh, Dalziel, 1329! on the Quorra, on dry ground, Vogel, 24!

Very near P. aphanoneurum, but of slender growth with branching culms and much narrower leaves.

Lordon of REL as legal con the line is given



43. P. fluviicola, Steud. Syn. Pl. Glum. i. 89. Perennial, cæspitose from a short rhizome. Culms suberect, geniculate, over 2 ft. high, about 4-noded, sparingly branched, terete, thickened at the nodes, like the whole plant quite glabrous. Leaf-sheaths tight, firm, striate, the lower longer, the upper shorter than the internodes: ligule a ciliate rim; blades narrowly linear, convolute, tapering to a long slender point, flexuous, 4-8 in. by 1 lin. Panicle up to 9 in. long, narrow, contracted, flexuous, much divided, all the divisions finely filiform to capillary, scaberulous; lower branches pseudo-verticillate, unequal, up to 3 in. long, undivided for a short distance from the base, then very loosely branched; penultimate divisions representing very lax racemes of up to 6 spikelets; lateral pedicels 1½ lin. long or longer, hardly thickened at the tips. Spikelets early gaping, $1\frac{1}{4}$ to almost $1\frac{1}{2}$ lin. long, pale greenish, with purplish tips. Glumes: lower obliquely ovate-lanceolate, mucronate-acuminate, two-thirds to three-quarters the length of the spikelet, appressed except the acumen, midnerve distinct, side-nerves up to 2 on each side, faint in transmitted light; upper obliquely lanceolate in profile, mucronate-acuminate, as long as the spikelet, the dull purplish acumen slightly recurved, faintly 7-nerved, nerves more distinct upwards. Lower floret of: valve similar to the upper glume, but slightly shorter, broader, less acuminate, without any mucro, paler to almost whitish below the tips, faintly 5-nerved; valvule shorter, ovate-lanceolate, acuminate; anthers $\frac{1}{2}$ lin. long. Upper floret ξ , oblong, obtuse, not quite 1 lin. long, glossy and smooth; valve and valvule subcrustaceous.—Jardin, Herbor. Côt. Occ. Afr. 6; Durand & Schinz, Consp. Fl. Afr. v. 749 (excl. syn.); Franch. in Bull. Soc. Hist. Nat. Autun, viii. 342 (reprint 34).

Upper Guinea. Southern Nigeria: Old Calabar, Robb! Cameroons: Bogalo District, Macleod! Tuburi marsh, Macleod! Ham river, Logone, Macleod, 151!

Lower Guinea. Gaboon: banks of the Gaboon river, Jardin! French Congo: Loango, in sandy places, Thollon, 1215. Belgian Congo: Lower Congo, Smith!

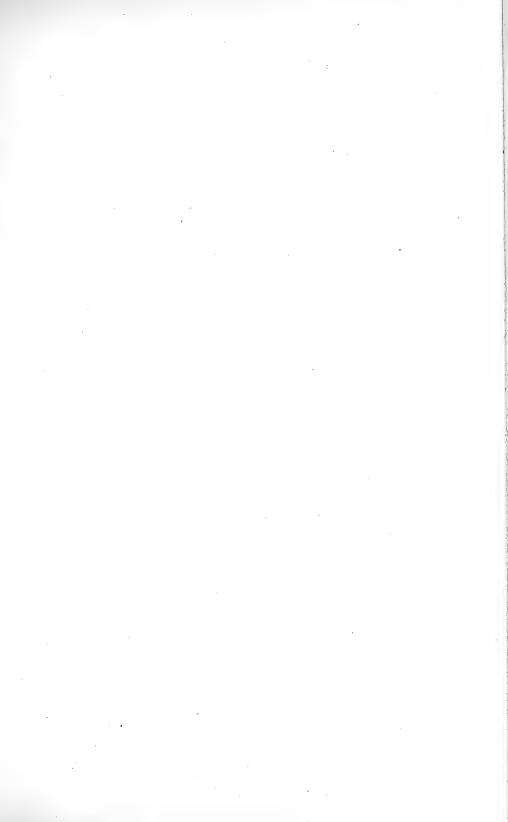
Jardin, *l.c.*, enumerates this species among the plants collected by him in Prince's Island, but on the label the "banks of the Gaboon river" is given as the locality.

44. P. genuflexum, Stapf. Perennial, up to 2 ft. high, forming tufts of flowering and barren culms, with intravaginal innovations. Culms repeatedly geniculate, ascending, terete, slender, smooth and glabrous like the whole plant, 4-5-noded, branched all along, the lower and intermediate branches repeating the features of the main culm, lower internodes wiry, bared by the slipping off of the sheaths, slightly thickened at the nodes. Leaf-sheaths rather firm, tight at first, greenish with purplish bases and dark nodes, finely striate; ligule reduced to a minutely ciliolate rim; blades linear from an equally wide base, tapering to a slender point, 3-6 in. by 2-2½ lin., flat or involute when dry, slightly glaucous, quite smooth, closely

and finely nerved, midrib very slender, primary lateral nerves about 3 or 4 on each side, very fine. Panicle oblong to obovoid, up to over 6 in. by 2-5 in., very loose and open, divided to the fourth degree, quite glabrous; common axis slender, finely striate or sulcate or angular upwards, like the primary divisions slightly scaberulous upwards, otherwise smooth; primary branches filiform, at length obliquely or the lowest subhorizontally spreading, approximate in pairs or scanty false whorls or scattered, lower pairs or whorls distant by $1\frac{1}{2}$ in., the lowest up to over 3 in. long, undivided for more than 1 in. or only for a few lines, then very loosely divided, the secondary branches very finely filiform, often flexuous, from over 2 to \frac{1}{2} in. long, at length divaricate, very loosely divided again, penultimate divisions with 3-2 distant spikelets, like the pedicels subcapillary, very slightly rough; pedicels very obscurely thickened at the tips, the lateral about 1 lin. long, or sometimes much shorter. Spikelets very early gaping, 1 lin. long, variegated with purple. Glumes membranous, finely or obscurely nerved, more or less purple; lower ovate, acute or obscurely mucronulate (acuminate in profile), 5-nerved, appressed except the tips; upper obliquely lanceolate-oblong, acuminate, almost 1 lin. long, 7-nerved. Lower floret 3: valve similar to the upper glume but broader, acute or subacute, 5-nerved; valvule slightly shorter, oblong, subacute, flaps widened and overlapping at the base; anthers $\frac{3}{4}$ lin. long. Upper floret \heartsuit , oblong, obtuse, ⁵/₈ lin. by ¹/₄ lin., white, glossy and smooth.—P. graciliflorum, Rendle n Cat. Afr. Pl. Welw. ii. 181 (partly).

Mozambique Distr. Zanzibar: Kokotoni, on dry soil, Hildebrandt, 1087! 1186! 1187! German East Africa: Usambara; Muoa, Holst, 3120!

44A. P. graciliflorum, Rendle in Cat. Afr. Pl. Welw. ii. 181 (partly). Perennial, up to over 2 ft. high. Culms crowded on a short rhizome, repeatedly geniculate, ascending, branched, slender, terete, smooth and glabrous, internodes long, the lower wiry. Leaf-sheaths tight, shorter than the internodes, striate, glabrous except for the minutely ciliate margins; ligules short, membranous, ciliate; blades linear, tapering to a long fine point, 6-10 in. by up to 2 lin., rather stiff, margins at length revolute, glabrous, midrib very prominent on the lower face. Panicles ovate in outline, 8 in. long, very loose and widely open, divided to the fourth degree, quite glabrous; common axis slender, finely striate or angular, like the primary divisions slightly scaberulous upwards, otherwise smooth; primary branches filiform, widely spreading, their divisions capillary; pedicels 2-4 lin. long. Spikelets laterally compressed, early much gaping, $1\frac{1}{4}$ lin. long, violet-purple. Glumes membranous, equal; obliquely oblong in profile, long and subulate- or mucronateacuminate or almost aristulate, equalling the spikelet, finely keeled upwards, the keel scaberulous, 3- to sub-5-nerved, the outer nerves faint and short; upper obliquely ovate in profile, mucronate, 5-nerved, the inner nerves joining at the tip, the outer some distance





below. Lower floret \circlearrowleft , very similar to the upper glume, but not mucronate nor with the nerves joining, although converging; valvule somewhat shorter, sharply keeled, with the flaps widening from the tips downwards. Upper floret $\mbox{\ensuremath{\notrelsign}}$, very broadly elliptic, obtuse, with narrow involute margins, $\mbox{\ensuremath{\notrelsign}}$ lin. long, brownish, polished.

Lower Guinea. Angola: Golungo Alto; in sunny sandy places between Cambondo and Trombete, rare, Welwitsch, 2959!

45. P. Griffonii, Franch. Contr. Fl. Congo Franc. in Bull. Soc. Hist. Nat. Autun, viii. 342 (reprint 34). Annual, tufted, \frac{1}{2}-3 ft. high. Culms erect or geniculate-suberect, usually branched all along or upwards with the branches erect, usually about 6-noded, terete, slender, densely hirsute to almost glabrous, internodes mostly at length bared by the slipping off of the sheaths. Leaf-sheaths at first tight, then loosened, somewhat firm, strongly and closely striate, more or less hirsute, sometimes densely so, hairs spreading from small persistent tubercles; ligule a densely ciliate rim; blades narrowly linear from an equally wide base, tapering to a slender point, $\frac{1}{3}$ to over 1 ft. long, 1-2 lin. wide, flat or convolute and flexuous, finely hirsute, mainly from the midrib and primary nerves, these 2-3 on each side, like the midrib very slender, somewhat prominent below, hardly differentiated above. Panicles terminal and axillary, oblong to obovate, contracted or open, flexuous or slightly stiff, 3-9 in. long, when opened out up to 4 in. wide and very loose, divided to the third or fourth degree, all divisions very slender to finely filiform, obliquely spreading when mature (see note below), upwards sharply angular and scabrid, all over loosely to very loosely and finely hirsute; primary branches irregularly scattered, often approximate in pairs or false whorls, with obscure motile cushions at the base, divided from the base or some distance (a few to 9 lin.) above it, the longest 2-5 in. long, divisions remotely divided again twice (below with 2 rarely 3 spikelets) or once, 8-2-spiculate; pedicels hardly widened at all upwards, the lateral 1-3 lin. long. Spikelets oblong, acutely acuminate, early gaping, sometimes widely so, slightly over 1 lin. long, pale greenish or brownish with darker tips, stiffly hairy. Glumes obliquely spreading to subdivaricate, very similar, obliquely lanceolate in profile, thinly membranous, finely and slightly prominently nerved; lower rather narrower and more finely acuminate, usually mucronate, three-quarters to over four-fifths the length of the upper, 5-nerved, upper 5-7-nerved. Lower floret 3: valve similar to the upper glume but slightly shorter, less or obscurely acuminate, 5-nerved, outer nerves very faint; valvule lanceolate-oblong, slightly shorter, acuminate, flaps wide below; anthers \frac{1}{3} lin. long. Upper floret $\mbox{$\slaikelpha$}$, oblong, about $\mbox{$\frac{2}{3}$}$ lin. by not quite $\mbox{$\frac{1}{4}$}$ lin., whitish, smooth, slightly glossy.—Th. & Hél. Durand, Syll. Fl. Congol. 632; Cheval. Sudania, 92. P. Zenkeri, K. Schum. in Engl. Jahrb. xxiv. 330: Th. & Hél. Durand, l.c. 635. P. hirsutulum, Rendle in Cat. Afr. Pl. Welw. ii. 176. P. mixtum, Mez in Engl. Jahrb. xxxiv. 147.

Upper Guinea. Sierra Leone: Mabould, 550 ft., Thomas, 3662! Nigeria: Lagos; on rocks, Dawodu, 186! Ebute Matta, Millen, 13! Cameroons: Yaunde, Zenker, 499! 542; and without precise locality, Buchholz; Dinklage, 605.

Lower Guinea. Gaboon: without precise locality, Griffon du Bellay! Munda District; Sibange Farm, Soyaux, 429! Belgian Congo: Cataracts District; in sandy Manioc fields near Lutété. 2000 ft., Hens, A. 284! French Congo: Upper Oubangui; Ungouras plateau, Chevalier, 6135! Angola: Pungo Andongo; in rocky places near springs near Quilombo, Welwitsch, 2824! between Pungo Andongo and Cambamba, Welwitsch, 7421!

Chevalier's specimens from the Upper Oubangui represent a stunted condition with the divisions of the paniele much more spreading and rigid than usual. Mez describes the mature fruits of his $P.\ mixtum$ as brown.

46. P. paucinode, Stapf. Annual, tufted, 1-2 ft. high. Culms erect or geniculate-suberect, very slender, glabrous, 1-2-noded, simple or sometimes branched from the lowest node, branches similar to the main culm, flowering. Leaf-sheaths thin, somewhat tight or the lowest at length loosened, striate, glabrous, shorter than the internodes, sometimes tinged with purple; ligule reduced to a narrow membranous ciliolate rim; blades linear from an equally wide or somewhat attenuated base, tapering to a slender point, 2-4 in. by 1-1½ lin., flat or convolute when dry, subflaccid, glabrous except for a small beard at the junction with the sheath, midrib and primary lateral nerves (2-3 on each side) slightly prominent below, very slender, hardly differentiated above, margins scaberulous. Panicles mostly in tiers of 2-3, shortly or the primary at length longexserted from the uppermost sheaths of the culm and its branches, open and very loose, oblong, up to over 1 ft. long by $1\frac{1}{2}$ -2 in., quite glabrous, divided to the fourth degree, all divisions very slender to almost capillary, scaberulous except the bases of the primary, obliquely spreading; primary branches mostly solitary and scattered, rarely pseudoverticillate, with minute motile cushions at the base, divided from 3-6 lin. from the base, or occasionally quite low down, the longest up to 2½ in. long, divisions distantly divided once or twice, 6-2-spiculate or the upper simple; pedicels 3-6 or occasionally 9 lin. long, tips slightly thickened and minutely discoid. Spikelets to over 1½ lin. long, oblong, acutely acuminate, soon gaping, yellowishgreen or tinged with purple. Glumes obliquely spreading but not divaricate, similar, thinly membranous, finely nerved; lower obliquely ovate to ovate-lanceolate in profile, acuminate, usually with a fine mucro, without the latter about two-thirds the length of the spikelet, 3-nerved, lateral nerves faint, midnerve slightly scaberulous; upper obliquely lanceolate-oblong, shortly acuminate, obscurely mucronulate, as long as the spikelet, 5-nerved, inner nerves prominent upwards. Lower floret &; valve very like the upper glume, but less acuminate and subacute; valvule almost as long as the valve, oblong, subacuminate, flaps broad downwards; anthers

46 try Parrier Water see Ming 1904

H6 Silverge in Melancine group in



 $\frac{3}{5}$ lin. long. Upper floret $\mbox{$\stackrel{\checkmark}{\circ}$}$, oblong, obtuse, $\frac{3}{4}$ lin. by $\frac{3}{10}$ lin., white, very glossy and smooth.

 ${\tt Upper}$ Guinea. Northern Nigeria : abundant in bush near Yola, ${\it Dalziel},\, 270$!

47. P. manicatum, Stapf. Annual, up to over 4 ft. high. Culms slender, very compressible, erect, many-noded, simple and erect or suberect for about 8 internodes $(2\frac{1}{2})$ ft.), then branching in tiers or fascicles, the main culm and the very slender to filiform branches repeatedly geniculate, only the last internode (peduncle) erect, culm and branches glabrous and smooth, internodes mostly bared by the breaking or slipping off of the sheaths, the upper channelled. Leafsheaths shorter than or more rarely as long as the internode, striate, more or less loosely hirsute or glabrous, the lower and intermediate swollen and sulcate-striate at the nodes, the swollen portion remaining as a ring covering the stem-node after the fall of the sheath; ligules membranous, very short, rounded, ciliolate; blades linear from a slightly constricted base, long-tapering to a slender point, $1\frac{1}{2}$ in. by $1\frac{1}{2}$ lin., flat, thin, green, glabrous except for some tuberclebased cilia near the base, margins scaberulous, closely nerved, midrib and primary lateral nerves hardly differentiated. Panicles erect, about 3 in. long, mature subfastigiate, obovate-oblong, glabrous, divided to the third or here and there the fourth degree, all the divisions finely filiform, angular or terete upwards, minutely scaberulous; primary axis very slender, terete below, angular above; primary branches solitary or approximate in pairs or false whorls, permanently obliquely erect rarely at length more spreading at an angle of up to 45°, very loosely divided from low down for up to 6 lin.; branchlets forming very lax 4-2-spiculate or downwards compound and then up to over 6-spiculate racemes; pedicels contracted, capillary, very unequal, quite short to up to 4 lin. long, tips minutely cupular. Spikelets lanceolate-oblong, apiculate-acuminate, soon gaping, about 1½ lin. long, green, variegated with purple, glabrous. dissimilar; lower ovate, mucronate-acuminate, half to two-thirds the length of the spikelet, subhyaline, with an excurrent midnerve and 1 or 2 minute obscure side-nerves on each side; upper glume corresponding in size and outline to the spikelet, broadly rounded on the back, prominently 7-nerved, tip contracted and usually dark. Lower floret 3: valve like the upper glume; valvule oblong, subacute, flaps much widened downwards; anthers \frac{1}{2} \lin. \long. Upper floret \overline{\gamma}, oblong, obtuse, \(\frac{3}{4}\) lin. long, greyish-white, very smooth and glossy; valve and valvule thinly crustaceous.

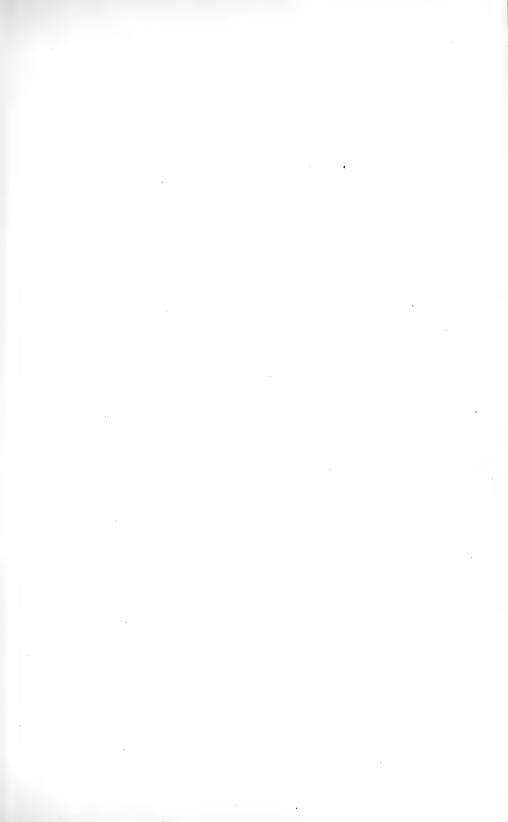
Mozambique Distr. Portuguese East Africa: Zambesi Delta; on flooded land between Mambucha and Vicente, Scott!

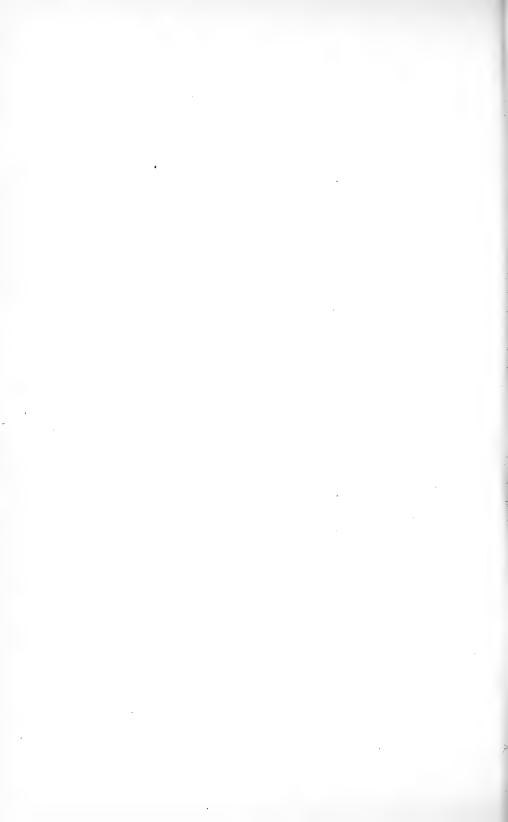
48. P. humile, Nees ex Steud. Syn. Pl. Glum. i. 84. Annual, tufted, ½-1½ ft. high, sometimes quite dwarf. Culms erect or

geniculate, in tall specimens often repeatedly so and arching, slender, glabrous and very smooth, often purplish, up to 4-noded, internodes up to over 4 in. long, branched from all or most nodes, with the branches often fascicled and very unequal, the longest occasionally almost equalling the main culm. Leaf-sheaths somewhat loose, striate, rarely much over 2 in. long, glabrous except at the upper margins which are sometimes delicately ciliate; ligule a minute ciliolate rim; blades linear from a slightly rounded base, tapering to a slender point, from less than 1 to over 6 in. by $1\frac{1}{2}$ -2 lin., flat, flaccid, quite glabrous, slightly scaberulous along the margins, midrib and primary lateral nerves (about 3 on each side) fine and slightly prominent below, less so or hardly at all above. Panicle open and very loose, oblong or in short specimens more usually ovate in outline, up to 4 (rarely 6) in. by 2 in., quite glabrous, divided to the third or sometimes the fourth degree, all divisions very slender, somewhat rigid, scaberulous upwards, obliquely erect or more or less spreading but hardly divaricate; primary branches scattered or more often irregularly approximate or pseudoverticillate, with minute motile cushions at the base, divided from the base or somewhat above it, the lower in large panicles up to over 2 in, long, divisions distantly divided again from the base or near it, forming very loose at length mostly contracted racemes of 6-2 spikelets or upwards simple; pedicels slightly thickened at the tips, lateral to over 1-3 lin. long; in dwarf specimens the panicles much smaller and more contracted. Spikelets 1 lin. long, oblong, acutely acuminate when closed, then more or less but never widely gaping, greenish or more often tinged with purple. Glumes obliquely erect, not divaricate, thinly membranous, finely nerved; lower obliquely lanceolate or ovate-lanceolate in profile, acutely acuminate, not or very obscurely mucronate, three-quarters to four-fifths the length of the spikelet, 3-nerved, midnerve smooth or very minutely scaberulous; upper similar but longer, wider, 5- to sub-5-nerved, the inner 3 nerves sometimes slightly prominent upwards. Lower floret barren: valve similar to the upper glume, but somewhat shorter and paler, 5-nerved; valvule distinctly shorter than the valve, empty or with minute rudimentary anthers. Upper floret \(\xi \), oblong, obtuse, $\frac{3}{5}$ $\frac{3}{4}$ lin. by $\frac{1}{4}$ lin., whitish, glossy and smooth; valve and valvule crustaceous; anthers not quite ½ lin. long, purplish.—Thwait. Enum. Pl. Zeyl. 360; Duthie, List Grass. N.-W. Ind. 4, and Fodd. Grass. N. Ind. 9; Hook. f. Fl. Brit. Ind. vii. 48, and in Trim. Handb. Fl. Ceyl. v. 152; Cheval. Sudania, 33 (partly). P. tenellum, Griff. Not. iii. 21, and Ic. Pl. Asiat. t. 139, fig. 194; not of Roxb.

Upper Guinea. Lower Senegal and Cayor: Tamboukane, Chevalier, 2234! Mohou, near Matam, Chevalier, 2235! Gambia, Mungo Park! Northern Nigeria: Nupe, Barter, 886 B!

Also in India, from Ceylon to Assam. Of the Indian specimens the taller agree exactly with those enumerated here, whilst the dwarf forms owing to





their stunted habit, more contracted smaller panicles and slightly plumper spikelets, have a facies of their own which at the first glance might suggest a distinct species.

49. P. Afzelii, Sw. Adnot. Bot. 5. Annual, tufted, \(\frac{1}{2}\)-1 ft. high. Culms erect or geniculately ascending, very slender and rather weak, glabrous, 2-4-noded, branched from all or most nodes, with the branches often fascicled and very unequal, the longest often equalling the main culm, all flowering. Leaf-sheaths thin, somewhat loose, striate, glabrous or more often ciliate or loosely hirsute upwards, the hairs fine, spreading from tubercles, longer or shorter than the internodes; ligule a minute ciliolate rim; blades linear from a slightly rounded base, tapering to a fine point, 2-5 in. by $1-1\frac{1}{2}$ (rarely 2) lin., flat, flaccid, sparingly hirsute, midrib and primary lateral nerves (2-3 on each side) very fine and slightly prominent below, hardly differentiated above, margins scaberulous. Panicle open and very loose, oblong, 3-5 in. by 1 to almost 3 in., quite glabrous, divided to the third or here and there the fourth degree, all divisions very slender to capillary, minutely scaberulous upwards, divaricate; primary branches scattered or more often approximate in false whorls or pairs, with a distinct motile cushion at the base, divided from the base or somewhat (up to 3 lin.) above it, the lower 2 (rarely 3)-1 in. long, divisions divided again, 6-2-spiculate or the upper simple: pedicels slightly thickened at the tips, the lateral if representing axes of the third or fourth degree very short to over 1 lin. long, otherwise like the terminal, often much longer (to over 3 lin.). Spikelets up to 1 lin. long, oblong, acuminate when closed, soon widely gaping, greenish or more often tinged with purple. Glumes divaricate, similar, thinly membranous, finely nerved; lower obliquely ovatelanceolate or lanceolate in profile, acuminate and mucronate or aristulate, three-quarters to four-fifths the length of the spikelet or sometimes including the awnlet as long as it, 1-3-nerved, midnerve scaberulous, outer nerves short and faint; upper obliquely oblong in profile, finely acuminate, sometimes shortly mucronulate, as long as the spikelet, 3-5-nerved, the inner 3 nerves sometimes slightly prominent upwards. Lower floret 3, somewhat gibbously semi-ovate in profile, acute or shortly acuminate, firmer and shorter than the lower glume, 5- (rarely 3-) nerved, side-nerves distant from the midnerve; valvule almost as long, flaps much widened downwards; anthers $\frac{1}{4}$ lin. long. Upper floret $\mode{9}$, oblong, subacute, $\frac{1}{3} - \frac{3}{8}$ lin. long, white or whitish, very smooth and glossy; valve and valvule thinly crustaceous.—Durand & Schinz, Consp. Fl. Afr. v. 767. P. divergens, Afz. ex Sw. l.c.; not of H.B. & K. P. muscarium, Trin. Ic. et Descr. Gram. ii. t. 235; Kunth, Enum. i. 105; Steud. Syn. Pl. Glum. i. 79. P. humile, Cheval. Sudania, 33, partly; not of Nees ex Steud.

Upper Guinea. Sierra Leone: Magbile, Thomas, 6467! by hard paths on

augite near Regent, Scott Elliot, 4115! and without precise locality, Afzelius! French Guinea: Fouta Jallon; Timbo, Pobéguin, 1716! 1717! 1717 bis! between Soumbalako and Boulivel, Chevalier, 18650! French Soudan: Middle Niger; Koulikoro, Chevalier, 2233!

- V/ Miliaceae -

50. P. callosum, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 374. Annual, up to 3 ft. high. Culms erect or geniculate-ascending, terete, rather slender, simple, about 3-noded, glabrous and smooth. Leaf-sheaths terete, somewhat loose, striate, ciliate along the outer margin, otherwise glabrous, shorter than the long internodes; ligules rounded, membranous, ½ lin. long, ciliate; blades linear from an attenuated base, long-tapering to a slender point, up to over 1\frac{1}{2} ft. by 3-5 lin., flat, flexuous or flaccid, glabrous or very sparsely hairy and ciliate upwards, margins scabrid, midrib slender or in the longest leaves stouter and more prominent downwards, primary lateral nerves 4-5 on each side, fine. Panicles contracted or slightly open, loose, narrow, over 1 ft. long, slightly nodding or erect, with their base at length shortly exserted from the uppermost sheath, glabrous, divided to the third or fourth degree, all the divisions filiform to subcapillary, angular and scabrid or the primary smooth at the base; primary axis slender, subterete and grooved or very angular and smooth below; primary branches scattered, often widely distant or the lowest whorled, up to almost 1 ft. long, very loosely divided from $\frac{1}{2}$ - $1\frac{1}{2}$ in. above the base; branchlets very long and remotely divided from high above the base, the penultimate divisions representing very loose usually 2-spiculate racemes; pedicels hardly thickened upwards, with truncate tips, the lateral 3-4 lin., the terminal up to 6 lin. long. Spikelets broad- or elliptic-oblong, subsubulate-acuminate, hardly turgid, 3 lin. long, glabrous, green or tinged with dull purple. Glumes falling with the spikelet, membranous, finely and prominently nerved; lower ovate-oblong equalling three-quarters of the lower mucronate-acuminate, floret, 7- or sub-7-nerved; upper broad-oblong, subsubulateacuminate, the tip laterally compressed, broadly rounded on the back, 9-nerved, nerves more prominent upwards. Lower floret barren: valve similar to the upper glume but less acuminate, sub-9-nerved, the innermost side-nerves evanescent below the upper third; valvule slightly shorter, oblong, truncate or subacute; stamens rudimentary or 0. Upper floret \(\begin{equation} \text{throughter} \), broad-elliptic-oblong, obtuse, 2 lin. long, brown, smooth and shining.—Steud. Syn. Pl. Glum. i. 77; Schweinf. Beitr. Fl. Aethiop. 300.

Nile Land. Abyssinia: Gallabat; near Matamma, Schweinfurth, 1081! Sana; by the Tacaze River near Jelajeranne, Schimper, 1713!

51. P. miliaceum, Linn. Sp. Pl. ed. i. 58. Annual, tufted 2-4 ft. high. Culms erect or geniculately ascending, terete, stout or slender, 4-5-noded, simple or sparingly branched, more or less softly hirsute below the nodes, the uppermost internode usually quite



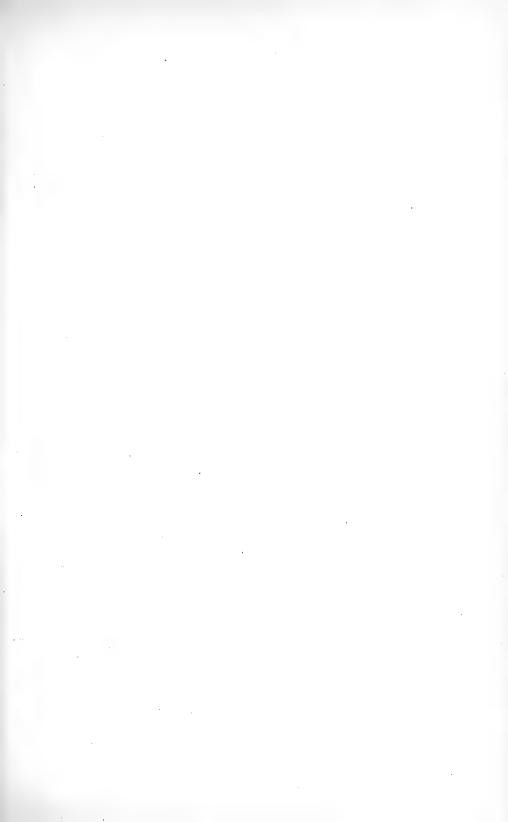


glabrous. Leaf-sheaths terete, somewhat loose or the upper tight, closely striate, spreadingly hirsute with conspicuously tuberclebased hairs, pubescent or loosely bearded at the nodes, longer or slightly shorter than the internodes; ligule a narrow ciliate rim; blades linear from an equally wide or slightly contracted and rounded base long-tapering to a slender point, \(\frac{1}{2}\) to over 1 ft. by 3-10 lin., flat, flexuous, usually glabrous except for the often ciliate lower margins and hispidulous dorsal midrib, rarely sparsely hairy all over, hairs long and fine, midrib somewhat stout and prominent below in large leaves, primary lateral nerves 3-6 on each side, very slender. Panicles contracted and rather dense or open, narrowly oblong, nodding, often with their base permanently enclosed in the uppermost sheath or only shortly exserted, up to 1 ft. long, in subspontaneous specimens usually scantier, looser and at length more open, divided up to the fourth or in cultivated specimens the fifth degree, all the divisions filiform, angular and scabrid; primary axis slender or somewhat stout below, subterete, striate or grooved and smooth towards the base; primary branches more or less approximate below, more distant upwards, up to two-thirds or three-quarters the length of the panicle, often much divided from low down; branchlets relatively long, the lower divided again in the same manner or like the remainder from much higher up with spikelets in small loose racemes of 2 (rarely 3) towards the summit; pedicels hardly thickened upwards, with truncate tips, the lateral from less than 1 to 3 lin. long, terminal somewhat (rarely much) exceeding the lower. Spikelets ovate-oblong to ovate-lanceolate, apiculate-acuminate, turgid, $2\frac{1}{4}$ - $2\frac{1}{2}$ lin. long, glabrous, green or brownish-green. Glumes persistent, unequal, strongly and prominently nerved; lower broadovate, acute, from half to two-thirds the length of the lower floret, 5-nerved; upper corresponding in size and outline to the spikelet, broadly rounded on the back, 11-nerved, tip contracted, apiculate to shortly rostrate. Lower floret barren: valve very like the lower glume; valvule ovate to ovate-oblong, truncate or emarginate, up to about one-third the length of the valve. Upper floret &, elliptic-oblong in outline, subacute, very convex on the back, up to over 1½ lin. by 1 lin., variously coloured (white, yellow, red, brown or black), very smooth and polished; valve and valvule crustaceous. Grain white.—Forsk. Fl. Ægypt.-Arab. civ.; Host, Gram. Austr. ii. 16, t. 20; Kunth. Enum. ii. 104, Suppl. 81; Trin. Pan. Gen. 194, and Sp. Gram. Ic. t. 221; Reichb. Ic. Fl. Germ. vii. t. 82; Steud. Syn. Pl. Glum. i. 77; Coss. & Durieu, Expl. Scient. Alger. ii. 32; Duthie, List Grass. N.-W. Ind. 5; Field and Gard. Crops, t. 23, and Fodd. Grass. N. Ind. 9; Schweinf. Beitr. Fl. Aethiop. 301, and in Bull. Herb. Boiss. ii. App. ii. 23; Fig. & De Not. in Mem. Ac. Torin. ii. xii. 354; Batt. & Trab. Fl. Alger. Monoc. 36; Aschers. & Schweinf, Illustr. Fl. Egypte, 160; Durand & Schinz, Consp. Fl. Afr. v. 754; Hook. f. Fl. Brit. Ind. vii. 45; Watt, Dict. Econ. Prod. Ind. vi. 12. *P. asperrimum*, Fisch. Cat. Hort. Govenk. ex Jacq. Eclog. Gram. 46, t. 31; Nees, Agrost. Bras. 199. *P. Milium*, Pers. Syn. i. 83. *Milium esculentum*, Moench, Method. 203; *M. Panicum*, Mill. Gard. Dict. Ed. viii. no. 1.

Mozambique Distr. Nyasaland : Manganja Hills near Soche, 3000 ft., Kirk ! Mungazi (cultivated), Kirk !

According to Schweinfurth, Höhnel found this species in cultivation in Kikuyu and Ukambani, 4200–5200 ft., British East Africa (Schweinf. in Höhnel, Discovery Lakes Rudolf and Stefani, ii. App. 352). Very commonly cultivated in India where it is supposed to have originated. I have seen no specimen which I should consider spontaneous. The specimens quoted above appear to belong to the form described by Koernicke (in Koern. & Wern. Handb. Getreidebau, i. 258) as *P. miliaceum*, var. contractum, f. luteum.

52. P. hippothrix, K. Schum. in Engl. Pfl. Ost-Afr. C. 103. Annual, 2-3 ft. high. Culms moderately slender, erect from a geniculate base, simple or sparingly branched, terete, easily compressible, glabrous, smooth, 4-5-noded, intermediate nodes exserted, lower and upper enclosed. Leaf-sheaths terete, the lower loose, the upper tight, glabrous or shortly hirsute upwards with tubercle-based hairs and ciliate towards the mouth, rarely sparingly hirsute all over, prominently striate, smooth; ligule a membranous densely and longciliate rim; blades linear from an equally wide or slightly attenuated base, long-tapering to a subsetaceous point, 6-9 in. by $1\frac{1}{2}$ - $2\frac{1}{2}$ in., flat, somewhat hard, flexuous, loosely and finely hairy above particularly towards the base where the hairs are sometimes gathered in a beard, glabrous or almost so on the back, scaberulous along the margins, otherwise smooth or slightly rough above, midrib very slender, primary lateral nerves about 3 on each side, more or less differentiated below only. Panicle erect, rather stiff, with its contracted base enclosed in the uppermost sheath, opening out upwards, wide and loose, up to over 1 ft. by over \frac{1}{2} ft., very loosely divided to the third degree, common axis slender, angular, smooth below, upwards like all the divisions scabrid, lowest internodes short, the following much longer (to over 3 in.); lower primary branches solitary or whorled, up to 9 in. long, filiform, remotely divided from 1-2 in. above the base, internodes $1\frac{1}{2}$ -1 in. long; secondary branchlets 3-1½ in. long, bearing very few spikelets; pedicels finely filiform, stiff, $2\frac{1}{2}$ to over 12 lin. long, slightly thickened towards the truncate tips and sometimes with a few short stiff hairs below them. Spikelets lanceolate-ovate or oblong, subulate-acuminate, about 2 lin. long, greenish or straw-coloured, sometimes tinged with purple, quite Glumes membranous, ovate, prominently nerved; lower very acute to subacuminate, $1\frac{1}{2}-1\frac{3}{4}$ lin. long, 5-nerved, nerves joined at their tips by cross-veins; upper of the size and outline of the spikelet, 7-9-nerved, both rounded on the back. Lower floret barren; valve very similar to the upper glume, but slightly shorter, 9-nerved; valvule oblong, subacute, shorter. Upper



floret $\mbox{$\stackrel{\lor}{\searrow}$}$, oblong, obtuse, $1-1\frac{1}{4}$ lin. by over $\frac{1}{2}$ lin., yellowish, polished; valve and valvule subcoriaceous; anthers dark purple, almost 1 lin. long.—Engl. Glied. Veg. Usambara, 22.

Nile Land. British East Africa: Tanaland, Linton, 206! Rabai Hills, near Mombasa, Taylor!

Mozambique Distr. German East Africa: Usambara; in fields near Tanga,

Saccleux, 2307! abandoned cultivation near Muoa, Holst, 3117!

Very similar to and possibly identical with P. obscurans (Isachne obscurans, Woodr.) from the Deccan, but the blades of P. obscurans are much wider (up to 7 lin.) and the panicle is perhaps on the whole more open with slightly larger spikelets. Woodrow says of his plant that the whole inflorescence breaks off and is driven about by the wind. According to the same author its grains are eaten as a fast-day food, and cooked like rice.

53. P. Kerstingii, Mez in Engl. Jahrb. xxxiv. 145. Annual, 2 ft. high, scantily tufted. Culms slender, erect, simple, terete, glabrous, smooth, 4-5-noded, nodes shortly (if at all) exserted. Leaf-sheaths terete, the lowest becoming involute and slipping off the stem, increasing in length upwards, the upper up to 6 in. long, glabrous below, more or less hirsute upwards with tubercle-based hairs, rigidly ciliate, prominently striate, smooth; ligule a membranous ciliate rim; blades linear from an equally broad base, tapering to a very acute point, 4-10 in. by $2\frac{1}{2}-3\frac{1}{2}$ lin., flat, somewhat flaccid, more or less finely hirsute from tubercle-based hairs on or by the midrib and primary lateral nerves and along the margins, midrib slender, nerves fine and close, prominent, 4-5 primary nerves distinctly differentiated below. Panicles erect, enclosed with their contracted base in the uppermost sheath, much opening out upwards and very loose, up to $1-\frac{1}{2}$ ft. by 4-10 in., divided to the fourth or sometimes the fifth degree; common axis slender, angular, smooth below, upwards like all its divisions scaberulous, exserted, internodes about 1 in. long or irregularly shorter (1/2 in.) and longer (up to 2 in.); lower and intermediate primary branches 6-10 in. long, solitary, very finely filiform, remotely divided from 1-13 in. above the base, internodes $\frac{1}{2}$ in. to over 1 in. long; secondary and ulterior branchlets subcapillary to capillary, the secondary 1-11 in. long, the tertiary or upwards the secondary bearing the spikelets towards their tips; pedicels from very short to 1½ (rarely 3) lin. long, somewhat thickened towards the truncate tips. Spikelets ovate-oblong, acute or shortly acuminate, $1\frac{1}{2}$ lin. long, pale green, often tinged with purple, glabrous. Glumes membranous, more or less prominently nerved upwards, rounded on the back, unequal; lower ovate, acute or mucronulate, up to half or two-thirds the length of the spikelet, 3-5-nerved; upper of the length and outline of the spikelet, 7-nerved. Lower floret barren: valve very similar to the upper glume, but slightly shorter and the nerves fainter; valvule very much reduced. Upper floret \(\timeg\), oblong, subobtuse, 1 lin. by \(\frac{1}{2}\) lin., turning yellowish, polished; valve and valvule subcoriaceous; anthers dark purple, over \frac{4}{5} lin. long.

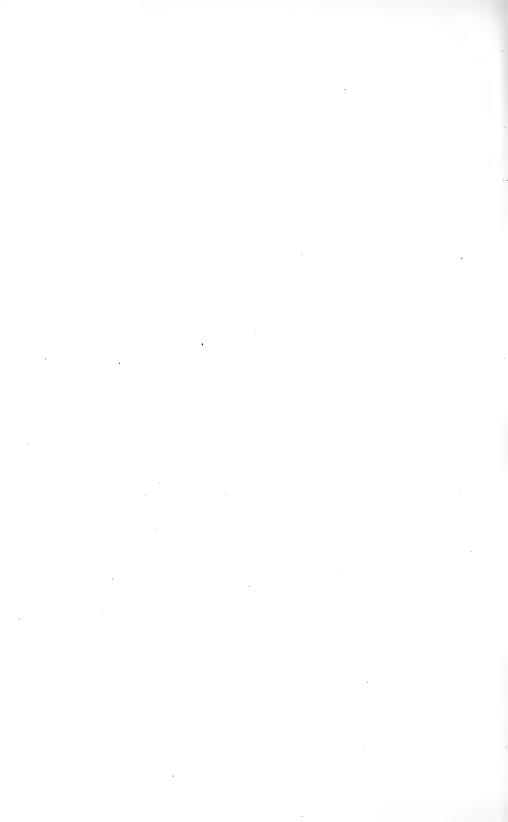
Upper Guinea. Togo: without precise locality, Kersting, 247, 253; Zech, 34, 46. Southern Nigeria: Lagos, Dawodu, 155! Aguku Distr.; Thomas, 623! 660! 956! 696! (inflorescence only). Northern Nigeria: Nupe; in cultivated land, Barter, 1374! Northern Cameroons: Logone river, Macleod, 150!

54. P. pansum, Rendle in Cat. Afr. Pl. Welw. ii. 177. Annual, tufted from a subgeniculate base, simple, 2-noded with the uppermost internode long-exserted and occupying much more than half the culm. Leaf-sheaths terete, tight, prominently striate, the lowest less than 1 in., the following $1\frac{1}{2}-2\frac{1}{2}$ in. long, loosely and scantily hirsute in the upper part with tubercle-based hairs, margins ciliolate; ligule a short ciliolate rim; blades linear from a slightly rounded base, tapering to a slender slightly callous point, 2-8 in. by $2\frac{1}{2}$ -3 lin., flat, rigidly suberect or oblique, drying yellowish, finely hirsute with minutely tubercle-based hairs along the midrib and on the nerves on the lower face and the margins, and less or more irregularly so on the upper, the hairs often deciduous, leaving the tubercles behind, midrib very slender, lateral nerves fine, prominent and very close, not differentiated. Panicles erect, long-exserted, ovate to broadoblong in outline, from ½ to over 1½ ft. long, very loose and open, divided to the third or fourth degree; common axis slender, terete to angular, smooth below, like all its divisions scaberulous upwards, internodes irregularly long (to over 1½ in.) and short; primary branches ascending, somewhat flexuous, solitary or here and there (particularly the intermediate) paired, very long, finely filiform, remotely divided from near the base or higher up, longest internodes up to 1 in. long, the following divisions capillary, the ultimate bearing the spikelets mostly in pairs near their tips; pedicels with minute discoid tips, the lower of a pair often very short, the upper $1-1\frac{1}{2}$ lin. long, those of solitary spikelets up to 6 lin. long. Spikelets ovate to ovate-oblong, shortly acute, 11 lin. long, drying a golden-brown. Glumes membranous, glabrous, very finely but prominently nerved, at least upwards: lower lanceolate and acutely acuminate in profile, half to three-quarters the length of the spikelet, 3-5-nerved; upper broader and less acuminate, acute, 5-7-nerved. Lower floret barren: valve very similar to the upper glume and as long, 7-9nerved; valvule much reduced (to half or less than the length of the valve), ovate, with the flaps evanescent above the middle. Upper floret &, elliptic-oblong, obtuse, up to 1 lin. long, brown, polished.

Lower Guinea. Belgian Congo: Stanley Pool Distr. (?), Vanderyst! Angola: Golungo Alto; in sandy places between Cambondo and Luinha, Welwitsch, 7261! Pungo Andongo; in sandy woods between Candumba and Lombe, Welwitsch, 2832!

55. P. lætum, Kunth, Rév. Gram. ii. 399, t. 113. Annual, more or less tufted, 1 to over 2 ft. high. Culms erect or geniculately ascending, terete or subterete, slender to rather stout, branched from below,





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glabrous or more or less hirsute below the nodes, 3-4-noded, usually shortly or the uppermost sometimes long exserted. Leaf-sheaths loose or tight, striate, quite glabrous, rarely more or less hirsute with tubercle-based ultimately deciduous hairs; ligule reduced to a thinly membranous ciliate rim; blades linear from a shortly rounded or equally wide base, long-tapering to a slender point, 3-8 in. by 2-5 lin., flat, pale or yellowish-green, quite glabrous and smooth except at the scaberulous margins, rarely more or less hirsute like the sheaths or rigidly ciliate towards the base, finely and closely nerved, primary lateral nerves 4-6 on each side. Panicle broadly obovate or turbinate in outline, very loose, open, 3-6 in. long and ultimately often almost twice as wide, divided to the third or fourth degree, slender, angular, striate or sulcate, smooth or more or less scaberulous; primary branches solitary, rather distant and stiff, subfiliform, oblique or the lower at length almost horizontal, up to 3 or 4 in. long, very loosely branched from 12-3 lin. above the base, scaberulous like the following divisions or smooth downwards; penultimate divisions rarely with more than 2 spikelets; pedicels finely filiform, very unequal, the lateral mostly longer to much longer than the spikelet, the terminal up to 6 lin. long, all with subcupular tips. Spikelets ovate to elliptic-oblong in outline, acute or subacuminate, hardly gaping except when ripening, 1½ lin. by ½ lin., greenish to straw-coloured, glabrous. Glumés thinly membranous, very unequal; lower broadovate, acute to subacute, clasping, about half the length of the spikelet, 5- (rarely 7-) nerved, nerves usually anastomosing below the tip: upper corresponding in size and outline to the spikelet, 7-9- (more rarely 11-) nerved, nerves prominent upwards. Lower floret barren: valve very similar to the upper glume; valvule oblong, acute, slightly shorter, flaps narrow. Upper floret \heartsuit , oblong, subacute, $1\frac{1}{4}$ lin. by slightly over ½ lin., pale olive-brown, very glossy and smooth: valve and valvule crustaceous; anthers 3/4 lin. long. Grain elliptic in outline, very obtuse, \(\frac{3}{4}\) lin. by over \(\frac{3}{8}\) lin., yellowish; scutellum more than half the length of the grain.—Kunth, Enum. Pl. i. 115; Steud. Syn. Pl. Glum. 73; Durand & Schinz, Consp. Pl. Afr. vi. 752 (partly). P. psilopodium, var. afrum, Stapf ex Cheval, Sudania, 34, 160 (name).

Upper Guinea. Senegal: Walo and Richard Tol, Perrottet. French Sudan: Middle Niger; Sompi, Chevalier, 2279! Takadji, Chevalier, 2281! Northern Nigeria: Katagum District, Dalziel, 262!

North Central. Baghirmi: Nigui, Chevalier, 9465! Massenia, Chevalier, 9621! Aouni, Chevalier, 9934!

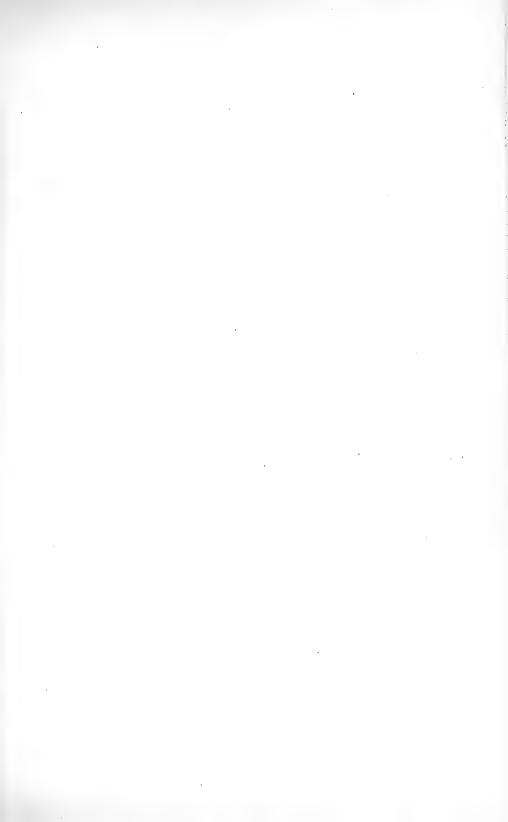
Dalziel says that this grass, known as "Baia" in the Katagum district, is an important food in time of scarcity.

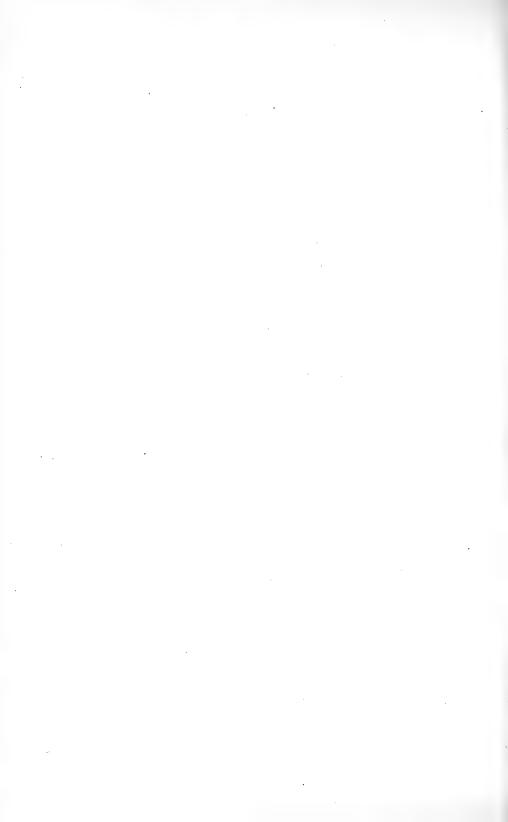
56. P. sociale, Stapf. Annual, up to almost 1 ft. high, growing in dense stands. Culms erect or geniculately suberect, filiform, terete, about 5-noded, simple or sparingly branched with all the branches flowering, more or less spreadingly hirsute with long very fine tubercle-based hairs, intermediate internodes about 1½ in. long,

exserted, lower and upper shorter and frequently enclosed in their Leaf-sheaths somewhat tight, terete, prominently and finely striate, hirsute with short spreading tubercle-based hairs; ligule a fine ciliolate rim; blades erect, the upper subappressed, linear, very slightly constricted at the base, tapering to an acute point, $1\frac{1}{2}$ -1 in. by $2-1\frac{1}{4}$ lin., flat, soft but somewhat rigid, yellowishgreen, densely and finely hirsute all over with the hairs conspicuously tubercle-based, margins scaberulous, midrib and primary lateral nerves (about 2 on each side) very fine to inconspicuous. Panicles erect. shortly exserted, ovate in outline, 2-3 in. by $\bar{1}\frac{1}{2}$ in., widely open, very loose, stiff, divided to the second, rarely third degree; common axis filiform, terete, smooth, with some fine long spreading hairs in the lower part, internodes 4-6 lin. long; primary branches very fine, $1\frac{1}{2}$ 1 in. long, smooth below, scaberulous upwards, the lowest bearing a few distant 2-spiculate branchlets or, like the others, solitary longpedicelled spikelets; pedicels mostly 3-6 lin. long, capillary, slightly thickened towards the truncate or subdiscoid tips. Spikelets ovateoblong, acute, $1\frac{1}{4}-1\frac{1}{2}$ lin. long, pale or tinged with purple, glabrous. Glumes thinly membranous, unequal, finely and somewhat prominently nerved; lower ovate, acute, half the length of the spikelet, 5-nerved; upper corresponding in length and outline to the spikelet, 7-nerved. Lower floret barren: valve very like the upper glume, but 9-nerved; valvule much shorter and more or less reduced. Upper floret \u22005, oblong, obtuse, up to 1 lin. long, uniformly dark chestnut-brown, polished; valve and valvule crustaceouscoriaceous.

Nile Land. Abyssinia: Gallabat; in wet places of the chors near Matamma, Schweinfurth, 1585! Sudan: without precise locality, Penton!

57. P. novemnerve, Stapf. Annual, in small tufts, 1-2 ft. high. Culms erect or ascending, rather slender or somewhat stout, 5-8noded, simple, or with weak flowering branches from some of the nodes, spreadingly hirsute, hairs conspicuously tubercle-based. Leafsheaths mostly much shorter than the internodes except the uppermost, terete, closely striate, hirsute like the culms except at the often elongated nodal bases which are delicately pubescent or loosely beset with very fine spreading, but not tubercle-based, longer hairs; ligules very short, membranous, truncate, ciliate; blades linear to lanceclate-linear from a slightly or inconspicuously rounded base, long-tapering to a slender point, 3-8 in. by 3-6 lin., flat, rather thin, with tubercle-based spreading hairs along the lower margins and midrib and here and there on the primary lateral nerves (above and below), otherwise glabrous and smooth, the hairs often early deciduous or more or less reduced or suppressed leaving bare tubercles, particularly on the nerves, margins scabrid upwards, midrib slender, prominent below, lateral primary nerves 5-6, fine. Panicles erect, broadly obovate to ovate in outline, early opening out and very lax,





the base enclosed in the uppermost sheath at the time of flowering, then exserted by 2-3 in., 4-8 in. by 2-6 in., divided to the fourth degree, all the divisions filiform to subcapillary, angular, scaberulous to scabrid, the lower part of the slender grooved or striate primary axis and often also the bases of the primary branches hirsute like the peduncle; primary branches in false whorls or approximate in pairs or solitary, the lowest up to over 4 in. long, at length spreading at an angle of 45-60°, very loosely divided from the base or a short (rarely longer, up to 5 lin.) distance above it, bearing usually 2spiculate spreading branchlets with the spikelets usually in their upper half or upper third; pedicels at length more or less appressed, subclavellate upwards, the lateral 1-2 lin., the terminal to 4 and even 6 lin. long. Spikelets ovate-oblong, acute, up to 14 lin. long, green or tinged with purple, glabrous. Glumes unequal, distinctly and more or less prominently nerved; lower broad-ovate, acute, about half the length of the spikelet, 5-nerved; upper corresponding in size and outline to the spikelet, broadly rounded on the back, 9- (very rarely 7-) nerved, nerves green, not anastomosing. Lower floret barren; valve very similar to the lower glume, always 9nerved; valvule elliptic-oblong, about half to two-thirds the length Upper floret \(\), oblong, subobtuse, almost 1 lin. long, dark brown to black when mature, very smooth and glossy; valve and valvule crustaceous.

Mozambique Distr. Rhodesia: Mashonaland; Salisbury, Allen, 692! $Mrs.\ Craster,\ 27!$ N. Mazoe District, Mundy! Buluwayo and Matoppo Hills, $Appleton,\ 6!$

Similar to the North American *P. capillare*, Linn., but differing in the morenoded culms with exserted internodes, the smaller less compound panicle and
slightly larger spikelets with a 9-nerved upper glume and lower valve. Hitchcock and Chase (Contrib. U.S. Nat. Herb. xv. 57) refer the plant described by me
in Flora Capensis, vii. 407 under *P. capillare* to *P. Gattingeri*, Nash, but a reexamination of the specimen suggests rather *P. barbipulvinatum*, Nash, another
segregate of *P. capillaris* (sensu lato), very widely distributed throughout the
inner and western States of the Union. It is also very similar to *P. atrosan-*guineum, but is coarser and taller, with slightly larger spikelets and more
numerous nerves in the upper glume and lower valve.

58. P. atrosanguineum, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 375. Annual, tufted, from a few inches to over 1 ft. high. Culms erect or geniculately ascending, very slender, terete, 4–5-noded, simple or sparingly branched with all the branches flowering, glabrous or spreadingly and softly hirsute with tubercle-based hairs, nodes exserted or in short specimens or towards the base enclosed. Leaf-sheaths tight, terete, thin, prominently striate, with the same indumentum as the culms; ligule a densely ciliolate rim; blades linear-lanceolate to linear from a more or less rounded base, tapering to an acute point, 1–4 (rarely more) in. by 2–4 (rarely 5) lin., flat, soft, green, more or less finely and shortly hirsute mostly from the midrib, the primary nerves and the otherwise smooth or upwards scaberulous

margins, hairs tubercle-based, midrib fine, primary lateral nerves 3-5 on each side, very fine, distinct below only, somewhat distant. Panicles erect, at length mostly exserted, sometimes much so, broadoblong to broad-ovate or obovate, widely open and loose, somewhat stiff, 3-6 in. by $1\frac{1}{2}$ -3 in., divided to the third or fourth or even fifth degree, glabrous or frequently the hairs of the culm spreading over the lower part of the common axis and its principal divisions; common axis subfiliform to filiform, terete or more or less angular, smooth or like its divisions slightly scaberulous upwards, lower and intermediate internodes 10-5 lin. long, with some shorter intermixed; primary branches filiform, more or less straight, particularly at maturity and like all the divisions more or less obliquely spreading, loosely divided from some distance (up to 5 lin.) above the base, more rarely from near the base and then the lower branchlets often subfasciculate and long; secondary branches subcapillary, the lowest of large panicles often $1-1\frac{1}{2}$ in. long; pedicels capillary, very unequal, 1-6 lin. long, with minutely discoid tips. Spikelets oblong to elliptic-oblong, acute to minutely apiculate-acuminate, $\frac{4}{5}$ to over 1 lin. long, greenish, usually variegated with purple, glabrous. Glumes thinly membranous, finely and somewhat prominently nerved, unequal; lower lanceolate from a broad-ovate clasping base, acute to acuminate or mucronulate, two-thirds the length of the spikelet, 5-nerved; upper corresponding in length and outline to the spikelet, 7-nerved. Lower floret barren: valve very similar to the upper glume; valvule oblong, acute, shorter than the valve or much reduced. Upper floret $\[\]$, oblong, obtuse, $\[\]$ lin. long, turning uniformly chestnutbrown to black-purple when ripe, polished; valve and valvule subcoriaceous, at length crustaceous; anthers ½ lin. long. Grain elliptic-oblong in outline, obtuse, \(\frac{3}{4}\) lin. long, white.—Steud. Syn. Pl. Glum. i. 84; Schweinfurth in Bull. Herb. Boiss. ii. App. ii. 23; Balf. f. Bot. Socotra, 311; Durand & Schinz, Consp. Fl. Afr. v. 741; K. Schum. in Engl. Pfl. Ost-Afr. C. 103; Rendle in Cat. Afr. Pl. Welw. ii. 176; Chiov. in Ann. Istit. Bot. Roma, viii. 308.

Nile Land. Nubian desert: without precise locality, Petherick! Eritrea: Medri od Tesfa; Mamut Mahader, Pappi, 6742. Abyssinia: Tigre; Hamedo plain, 4600 ft., Schimper! Sana; near Jelajeranne, Schimper, 1709! Samen; Dehli Dikeno, Schimper, 257! and without precise locality, Schimper, 230! 769! Socotra: on Haghier, Balfour! Uganda: Kafuru (acc. to K. Schumann); Victoria Nyanza region, Maitland, 209! Nakuru, on very dry ground, Scott Elliot, 6819! British East Africa: Nairobi, M. J. Johnston, 47! Linton, 28! Makindu, Linton, 113!

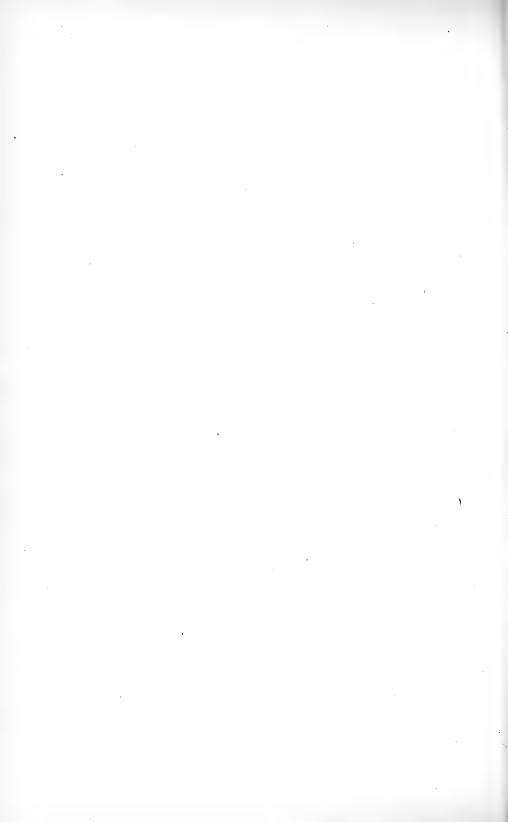
Lower Guinea. Angola: Pungo Andongo; Muta Lucala, Welwitsch, 2722! in damp sandy meadows at the Luxillo river between Pungo Andongo and Cambambe, Welwitsch, 7418! in sandy places near Luxillo, Welwitsch, Coll.

Carp. 1088!

Also in tropical Arabia. According to Welwitsch excellent fodder for cattle.

59. P. arcurameum, Stapf. Annual, tufted, about 1 ft. high. Culms radiating from the centre and geniculately ascending, 5-6-noded,

59 But Bucker B. Tallet and



branched from the lower and middle nodes, with the branches shorter than the culms and all flowering, terete, hirsute, hairs spreading, long, particularly towards the panicle, and very fine, internodes more or less exserted. Leaf-sheaths subherbaceous, loose, strongly striate, softly hirsute with tubercle-based hairs; ligule reduced to a shortly ciliate rim; blades linear from a somewhat rounded base, tapering to an acute point, about 3 in. by $2\frac{1}{2}-3\frac{1}{2}$ lin., flat, soft or almost flaccid, loosely hairy on the nerves, hairs like those of the sheaths, margins scaberulous, primary lateral nerves 3-4 on each side, little distinct, midrib very fine. Panicle oblong or ultimately ovate in outline, often slightly nodding or at least the ends of the branches drooping, 3-4 in. by 1-3 in., opening out towards maturity, divided to the fourth or fifth degree; primary axis slender, terete, striate and loosely hairy below, more angular, glabrous and scabrid upwards; primary branches scattered or irregularly approximate in pairs, the lower 1 to over 2 in. long, ascending and then curving outwards, or flexuous, more rarely straight and stiff, filiform, like all the divisions sharply angular and scabrid, sparingly hairy towards the base, divided from 6-2 lin. above the base; penultimate divisions 2-spiculate from near the base (pedicels 2-nate) or higher up; pedicels fine, clavately thickened at the tips, the lateral rarely over ½ lin. Spikelets oblong, acute, $1-1\frac{1}{4}$ lin. long, hardly gaping before maturity, greenish with dark purple tips or the glumes tinged with purple, glabrous. Glumes thinly membranous, very unequal, more or less prominently nerved; lower ovate, acute, clasping, 5-nerved, half the length of the spikelet; upper corresponding in size and outline to the spikelet, 7-nerved. Lower floret barren: valve very similar to the upper glume but 9-nerved; valvule oblong, acute, shorter than the valve, flaps very narrow or almost 0. Upper floret \u2215, oblong, subacute, $\frac{3}{4}$ lin. by $\frac{1}{3}$ lin., very dark brown when ripe, very glossy and smooth; valve and valvule crustaceous. Grain elliptic in outline, obtuse, white.

Mozambique Distr. Transvaal: in sandy places near Mara, 3300 ft., Schlechter, 4614!

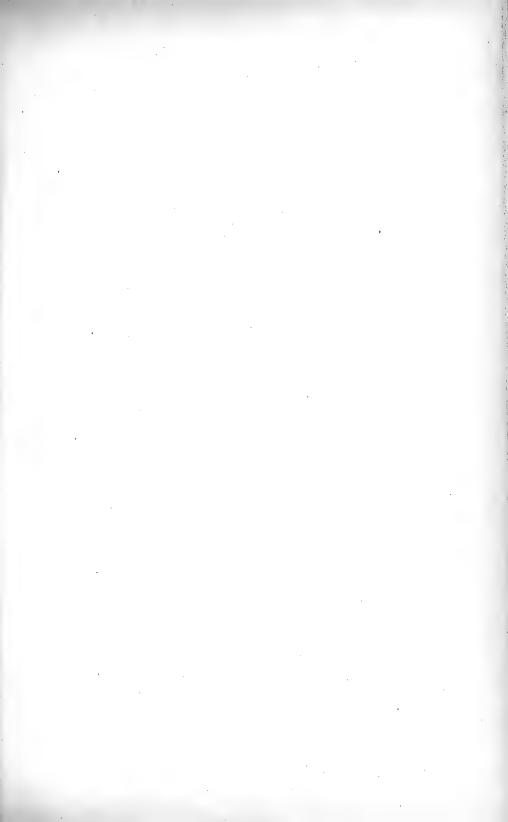
Distributed as P. hirticaulum, Presl, a Mexican species with larger and more acuminate spikelets and pale fruits.

60. P. haplocaulos, Pilger in Engl. Jahrb. xxxiii. 49. Annual, about 1 ft. high, growing gregariously in close stands. Culms almost filiform, erect, simple, 4–5-noded, with the nodes exserted, terete, glabrous, smooth, sometimes rooting from the lowest node. Leaf-sheaths thin, terete, glabrous, smooth, finely striate; ligule a membranous ciliate rim; blades erect, setaceously convolute, 4–5 in. long, when flattened out $\frac{3}{4}$ lin. across, erect, rather soft, glabrous or with tubercle-based spreading marginal or submarginal hairs downwards, quite smooth, midrib fine, like the primary lateral nerves (2 on each side) more or less prominent below. Panicles

reduced to the common axis and 3-1 distant branches each bearing 4 or 1 spikelet; common axis up to $2\frac{1}{2}$ in, long, smooth below, otherwise, like its very finely filiform to capillary divisions, scaberulous, branches up to over 1 in. long, undivided for one-third to over half its length from the base; pedicels very unequal, the lateral often very short, the terminal up to 6 lin. long, rather stiff, slightly thickened towards the truncate or subdiscoid tips. Spikelets oblong, acute, 1½ lin. long, greenish to straw-coloured, quite glabrous. Glumes unequal, membranous, finely and upwards somewhat prominently nerved; lower ovate, acute, up to half the length of the spikelet, 5-nerved, nerves joining by their tips; upper of the length and outline of the spikelet, 7-nerved. Lower floret reduced to its valve, this very similar to the upper glume. Upper floret \lozenge , oblong, subacute, almost as long as the spikelets, at length fuscous, polished; valve and valvule thinly coriaceous.

Nile Land. Jur: Ghattas' Great Seriba, Schweinfurth, 2003!

61. P. turgidum, Forsk. Fl. Egypt.-Arab. 18. Suffrutescent, up to 4 ft. high, with stout root-fibres (over 1 lin. in diam.) and large extravaginal innovation-buds which grow into erect or ascending or long prostrate culms, which together form low dense bushes; cataphylls ovate to oblong, firm, whitish, finely pubescent to tomentose at the base. Culms terete, woody, solid, 1-2 lin. diam., the whole plant very glaucous, glabrous and smooth, many-noded with very unequally long internodes (up to over 6 in. long), frequently producing fascicles of numerous short or long branches from the nodes, the strongest of which may repeat this mode of branching. Leafsheaths firm to coriaceous, those supporting branches soon drying up, becoming straw-coloured and thrown aside, 1-3 in. long, the upper very tight, all glabrous, smooth and very finely striate; ligule reduced to a dense ciliate rim; blades extremely variable in size, linear, tapering to a fine pungent point, when well developed up to 8 in. by 3½ lin., flat, rigid, but mostly more or less reduced, often to mere sharp points, glabrous, smooth below, slightly rough above, with distant spinules along the margin, midrib very slender, whitish, lateral nerves very numerous, close, fine, prominent, not or hardly differentiated. Panicles very different in size, those of lateral branch clusters usually much reduced, short and mostly narrow, the longest 6-9 in. by $2-3\frac{1}{9}$ in., oblong or obovate-oblong in outline, divided to the fourth degree; common axis slender, terete, smooth, finely striate, lowest 1 or 2 internodes up to 2 (rarely 3) in. long, the following much shorter, primary branches divided from low down but the basal branchlets of the lowest often arrested, flexuous, the longest about half the length of the panicle, filiform, more or less angular and scabrid or scaberulous, ultimate divisions short and contracted, often much reduced and then the branches racemiform to spiciform; pedicels subterete, scaberulous, very short, to 2 lin.





long, rarely the terminal elongated. Spikelets ovoid, acuminate, turgid, about 2 lin. long, glabrous, glaucous, soon more or less gaping. Glumes firmly membranous, subequal and about as long as the lower floret, or the lower slightly longer, the latter lanceolate and acutely acuminate in profile, 7-nerved, the upper obliquely ovate and acute or subacuminate in profile, 9-nerved, both rounded on the back, nerves prominent upwards. Lower floret of; valve very like the upper glume and also 9-nerved; valvule broad-oblong, acute, flaps widened downwards; anthers over 1 lin. long. Upper floret \$\overline{\pi}\$, lanceolate- to elliptic-oblong in outline, acute, about 1½ lin. by 1 lin., very convex on the back, polished, brownish when ripe; valve and valvule more or less coriaceous; anthers 1 lin. long. Grain ellipticrotundate, apiculate, convex on both sides, fuscous, slightly over 1 lin. long.—Delile, Fl. Égypte, 19, t. 9, fig. 2; Trin. Diss. Gram. Pan. 189, Gram. Icon. & Descr. ii. 227, and Pan. Gen. 221, and in Mem. Acad. Pétersb. sér. vi. iii 307; Kunth, Enum. i. 97; Fig. & De Not. in Mem. Ac. Torin. ser. 2, xiv. 354; Steud. Syn. Pl. Glum. i. 88; Schweinf. Beitr. Fl. Aethiop. 301, in Verh. Zool. Bot. Gesellsch. Wien, xv. 557, Piant. Util. Eritrea, 53; in Bull. Herb. Boiss. sér. ii. App. ii. 23; Boiss. Fl. Or. v. 441; Aschers. & Schweinf. Ill. Fl. Égypte, 160, 778, 807, 813; Duthie, Fodd. Grass. N. Ind. 13; Martelli in Nuov. Giorn. Bot. Ital. xx. 368, 371; Balf. f. Bot. Socotra, 310; Durand & Schinz, Consp. Fl. Afr. v. 766; Hook. f. Fl. Brit. Ind. vii. 44; Chiov. in Ann. Istit. Bot. Roma, vi. 166; viii. 34, 307; Engl. Veget. Verhält. Somaliland, 10, 43, 44; Stapf in Kew Bulletin, 1907, 214; Cheval. Sudania, 25; Muschler, Man. Fl. Egypt, i. 57. P. nubicum, Fig. & De Not. in Mem. Ac. Torin. ser. 2, xiv. 352, t. 21, fig. 1-12; Durand & Schinz, l.c. 756.

Upper Guinea. Senegambia: without precise locality, Heudelot, 393! French Sudan: Timbooctoo, on dunes near Korioume on the banks of the Niger, Chevalier, 1221!

Nile Land. Nubia: Soturba Mountains, filling the wadis, Schweinfurth. Erba Mountains, between 3000 and 4000 ft., Bent! Otau, Johnston, 12! Tokar, Massey! Wadi Laemeb, Schweinfurth, 509! Wadi-Halfa, Letourneux, 310! "Nubian desert," Petherick! Eritrea: Dahlak Archipelago; Sciumma Island, Tellini, 76, 769. Damoeita; Assar-Ka Island, Terracciano, 2619; Dilemmi Island, Terracciano, 817. Assab, Beccari. Samhar; Massaua, Arcadipane, Cocastelli. Mokullo, Schweinfurth; Otumlo, Tellini, 42; Terracciano & Pappi, 2583 and 2587. Dogali, Terracciano & Pappi, 2624; Emberemi, Pappi, 1627! Habab; various localities, Terracciano & Pappi, 1026, 1628, Pappi, 1627! Habab; various localities, Terracciano & Pappi, 1026, 1628, 1629. Assaorta; Valley of Camailé, Pappi, 5892! Arkiko, Pappi, 2623! and 1629. Assaorta; Valley of Camalle, Pappi, 3892! Arkiko, Pappi, 2623! and numerous other localities quoted by Chiovenda, l.c. Dembesa, along the Mai Atal, Pappi, 4759. Bogos; Keren, Tellini, 810. Baza; Badum, along the Mareb river, Pappi, 6839. Barca, Agordat, Terracciano & Pappi, 2815; Agordat-Adarté, Terracciano & Pappi, 2757. Cordofan: Abu Gerad, Kotschy, 29! Darfur: El Fasher, Pfund! Somaliland: Zeyla, Drake-Brockman, 715! between Hargeisa and Berbera, Robecchi. Laku, Keller, 139! Mandera, Keller, 143! Socotra: Galonsir, Schweinfurth, 717! and without precise locality, Ralfone. 75!

Also in Egypt, Cyprus, Southern Palestine, and eastwards through Southern Persia and Baluchistan to Sind.

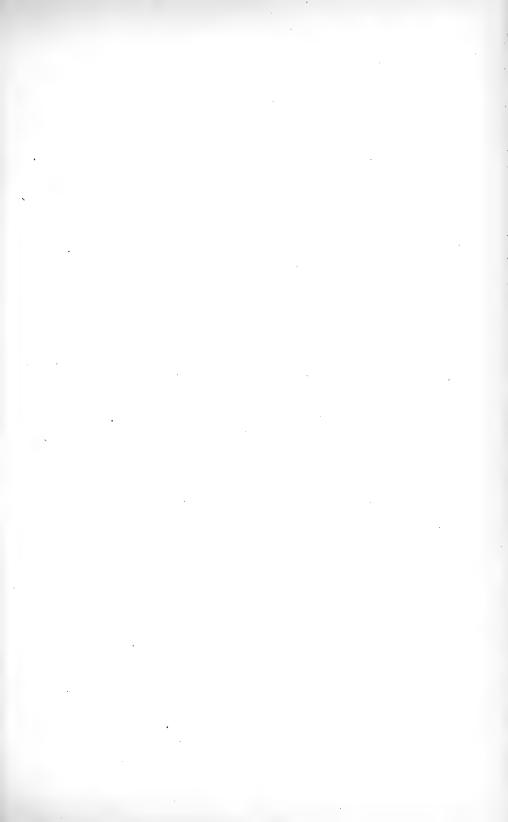
Excellent fodder for camels.

62. P neglectum, Roem. & Schult. Syst. ii. 451. Perennial, suffrutescent (?). Culms stiff, terete, hard, over 1 lin. in diam., glaucous and glabrous, like the whole plant, with the internodes long-exserted from the sheaths and up to 3 in, long, with short erect or spreading branches from all the nodes. Leaf-sheaths firm, prominently striate, up to over 1 in. long; ligule a ciliate rim; blades linear, tapering to a pungent point, $1-1\frac{1}{2}$ in. by up to 2 lin., rigid, spreading or deflexed, flat below, convolute upwards or convolute all along, smooth. Panicles up to over 1 in. long, narrow, divided to the second degree; common axis very slender, terete or angular, lowest internodes about 3 lin. long; primary branches scaberulous, up to 5 lin. long, forming short dense racemes or, higher up, clusters; pedicels shorter to much shorter than the spikelets. Spikelets turgid, ovoid-globose, 1\frac{3}{4} lin. by over 1 lin., somewhat gaping. Glumes firmly membranous, shortly and acutely acuminate in profile; lower obliquely ovate, two-thirds to fourfifths the length of the spikelet, 5-nerved, nerves evanescent above the middle, joined upwards by delicate cross-nerves; upper obliquely oblong-elliptic in profile, much curved to almost gibbous above the middle, as long as the spikelet, firmly 9-nerved, almost grooved between the unconnected nerves. Lower floret 3: valve very similar to the upper glume, but subobtuse with widened hyaline margins towards the tips; valvule as long as the valve, elliptic, obtuse, keels sharp and scaberulous downwards with the narrow flaps suddenly widened towards the base; anthers $1\frac{1}{4}$ lin. long. Upper floret $\mbox{\ensuremath{\mbox{$\stackrel{\triangle}{\beta}$}}}$, obliquely obovate in profile, broadly elliptic in dorsal view, apiculate, $1\frac{1}{4}$ lin. long, polished; valve and valvule subcoriaceous, the former faintly 7-nerved. Grain ovate in outline, acute, whitish.—Kunth, Enum. i. 132; Steud. Syn. Pl. Glum. i. 81.

The specimen in Herb. Shuttleworth (British Museum) answers perfectly to Roemer & Schultes' description and represents evidently the type or a cotype. No indication of its origin is given beyond the inscription "Africa." The affinity of P. neglectum with P. turgidum is quite clear, and it is like the latter manifestly a desert grass of a pronounced xerophytic structure.

63. P. repens, Linn. Sp. Pl. ed. ii. 87. Perennial, up to 2 (rarely 4) ft. high; rhizome long, creeping, innovation-shoots mostly extravaginal, often growing into long stolons. Culms erect or ascending, glabrous, many-noded, simple or branched at the base, the barren shoots densely and distichously leafy. Leaf-sheaths generally exceeding the internodes, the lower more or less loose, wide and tough, the upper tight, all ciliate along the margins, otherwise usually smooth and glabrous or the lower more or less finely hirsute or pubescent, with tubercle-based hairs; ligule a membranous ciliate rim; blades linear, shortly tapering to a callous point, 2½-6 in. by 1½-3 lin., usually involute, very firm and rigid, spreading, glaucous,

[&]quot;Africa" (Collector?).





glabrous or hairy, particularly on the upper surface downwards, margins cartilaginous, smooth or appressedly spinulose and sparingly tubercled near the base, very closely and finely nerved, midrib and primary nerves very slender if at all differentiated. Panicle usually contracted, erect and stiff, rarely slightly nodding, 3-8 in. long, glabrous, divided to the third or (downward) fourth degree; main axis and all divisions glaucous, increasingly filiform, angular and upwards scaberulous or scabrid, often somewhat wavy; primary branches usually erect, solitary or approximate in pairs or threes, the lower mostly remote and 2-6 in. long, sparingly divided, the penultimate divisions forming loose or contracted 6-2-spiculate racemes; pedicels with subcupular tips, the lateral about 1½ lin. long. Spikelets ovateoblong, acute to subacuminate, $1-\frac{13}{8}$ lin. long, glabrous, pale. Glumes very unequal; lower subhyaline, whitish, very broad, clasping, rounded or shortly acute, midnerve very slender, percurrent, side-nerves 1-4 on each side, very short and fine; upper thin, membranous except at the firmer tip, broadly rounded on the back, corresponding in shape and size to the spikelet, 9-7-nerved, nerves prominent upwards. Lower floret 3: valve very like the upper glume but less acute or acuminate, 9-nerved; valvule subequal, oblong, obtuse to acute; anthers up to almost 1 lin. long. Upper floret &, elliptic-oblong, subacute, 1 lin. long, white, smooth and glossy: valve and valvule coriaceous-crustaceous, faintly 7-nerved. Grain white, \(\frac{3}{4}\) lin. long.—Forsk. Fl. Ægypt.-Arab. xix; Desf. Fl. Atl. i. 60; Cav. Ic. et Descr. ii. 6, t. 110; Sibth. & Smith, Fl. Græc. i. t. 61; Trin. Pan. Gen. 182, and in Mém. Acad. Pétersb. 6me sér. iii. 270; Kunth, Enum. i. 103; Cosson & Durieu, Expl. Scient. Alger. ii. 31; Benth. Fl. Hongk. 412, and Fl. Austral. vii. 484; Ball, Spicil. Marocc. in Journ. Linn. Soc., Bot., xvi. 709; F. von Muell. Select. Extratrop. Pl. ed. iv. 223; Duthie, List Grass. N.-W. Ind. 6, and Fodd, Grass. N. Ind. 11; Durand & Schinz, Consp. Fl. Afr. v. 760; Franch. Contr. Fl. Congo Franc. in Bull. Soc. Hist. Nat. Autun. viii. 345 (37 of reprint); Hook. f. Fl. Brit. Ind. vii. 49; Lamson-Scribner, Amer. Grass. 70; Maiden, Man. Grass. N.S.W. 44; Rendle in Cat. Afr. Pl. Welw. ii. 181, and in Journ. Linn. Soc., Bot., xxxvi. 332; Stapf in Dyer, Fl. Cap. vii. 409; Merrill in Philipp. Journ. Sci. i. Suppl. 359; Hitchcock & Chase in Contr. U.S. Nat. Herb. xv. 85; Cheval. Sudania, 33; Eyles in Trans. R. Soc. S. Afr. v. 300; Backer in Teysmannia, xxviii. 273, t. 38; Muschler, Man. Fl. Egypt, i. 57. P. notatum, Retz. Obs. Bot. iv. 18. P. ischæmoides, Retz. l.c. 17; Nees in Nov. Act. Nat. Cur. xix. Suppl. i. 175; Miq. Fl. Ind. Bat. iii. 450. P. arenarium, Brot. Fl. Lusit. i. 82; Trin. Pan. Gen. 181, and in Mém. Acad. Pétersb. 6me sér. iii. 269; Nees, Fl. Afr. Austr. 37; Steud. Syn. Pl. Glum. i. 73. P. leiogonum, Delile, Fl. Aegypt. Ill. 51; Poir. Encycl. Suppl. iv. 284; Kunth, l.c. 104; Steud. l.c. 79; Barbey, Herbor. Levant, t. 8, fig. 4; Aschers. & Schweinf. Illustr. Fl. Egypte, 160; Durand & Schinz, l.c. 752. P. convolutum, P.

Beauv. ex Spreng. Syst. i. 319; Nees, Agrost. Bras. 173; Presl, Rel. Haenk. i. 304; Kunth, l.c. i. 130; Steud. l.c. 73; Mig. l.c. iii. 450.

Upper Guinea. Sierra Leone: Mungem, 50 ft., Thomas, 7258! Sherbro; in the streets of Bonthe, Dalziel, 941! French Sudan: Niger Bend; Faguibine, Chevalier, 2248! Middle Niger; Goundam, Chevalier, 2247! Southern Nigeria: Lagos, Millen, 80! by water, Dawodu, 215! Northern Nigeria: Nupe, in wet places, Barter, 1355! Cameroons: in sandy flats near the beach, Batanga, Bates, 335!

Nile Land. Sudan: Hillet en Nuer on the Bahr el Gebel, Broun, 1100! Uganda: Entebbe, by the lake, 4000 ft., Dummer, 3068! Mibanye, edge of lake,

3780 ft., Dummer, 1407!

Lower Guinea. French Congo: Alima River, Thollon, 955! Belgian Congo: Stanley Pool Div.; Kwamouth, Vanderyst, 3724! Mpie, Vanderyst, 3804! Angola: Huilla; on river banks near Lopollo, Welwitsch, 2674!

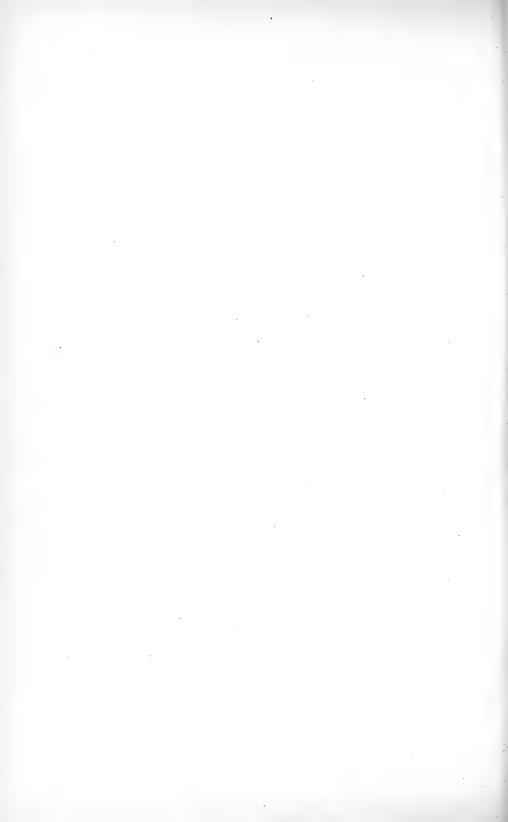
Mozambique Distr. Rhodesia: Victoria Falls, Rogers, 5009; 13138!

Widely distributed on the tropical and subtropical coasts of both hemispheres and in India and Africa, also in and along rivers; probably originally a native of the Old World.

Considered a very good fodder and also useful as a sandbinder.

64. P. pinifolium, Chiov. Result. Scient. Miss. Stefanini-Paoli, i. Coll. Bot. 184. Perennial, cæspitose, quite glabrous; rhizome short, emitting numerous long fibrilliform roots and tufts of erect shoots and creeping or ascending stolons; shoots and stolons branching when reaching the surface, forming dense intricate tufts from 2-4 in. high, or some of them much stouter, elongated (to over 2 ft.), prostrate and shortly branched; underground parts covered with persistent sheaths, erect overground branches fascicled, slender, many-noded, closely sheathed. Leaf-sheaths terete, smooth, firm, slightly striate, of the underground parts or prostrate branches up to 1½ in. long and the lowest bladeless, of the short erect branches under 5 lin. long; ligule reduced to a fringe of minute stiff hairs; blades firm, linear-lanceolate to sublinear, tapering almost from the base, those of the long shoots up to 2 in. by 2 lin. (when flattened out), of the short shoots from less than $\frac{1}{2}$ to over 1 in. long, tightly involute, needle-shaped, rigid, spreading, crowded, all rather blunt, finelynerved. Panicles scarcely exserted from the uppermost leaves, up to almost \frac{1}{2} in. long, divided to the second or at the base the third degree, all the divisions finely filiform, rigid, glabrous, smooth; primary branches 4-5, solitary, up to 3½ lin. long, forming simple or the lowest downwards compound 6-2-spiculate contracted racemes; pedicels slightly thickened upwards, very short to 1 lin. long. Spikelets ovoid, subturgid, subacute, almost 1 lin. long. Glumes membranous, broad-ovate; lower shortly acute, half the length of the lower floret or almost so, carinate towards the tip, side-nerves short, 1-2 on each side; upper obliquely elliptic in profile, obscurely and obtusely acuminate, 5-nerved. Lower floret of: valve very similar and equal to the upper glume; valvule slightly shorter, broad-ellipticoblong. Upper floret &, elliptic in outline, subobtuse, \(\frac{3}{4}\) lin. long,

syn of 63 P. Krishavaense Vander-fide Rob.



greenish-brown, smooth and glossy; valve and valvule thinly crustaceous.—P. Appletonii, Stapf in Kew Bulletin, 1907, 225.

Nile Land. Italian Somaliland: in sand near Obbia, Appleton! common on all the dunes along the coast near Mogadiscio and El Sai, Paoli, 14, 296.

65. P. rigidum, Balf. f. in Proc. Roy. Soc. Edinb. xii. 97, and Bot. Socotra in Trans. Roy. Soc. Edinb. xxx. 311. Perennial, densely cæspitose with numerous tough root-fibres and intra- and extravaginal innovations, the buds of these covered with papery or membranous pale downwards appressedly hairy cataphylls. Culms many, slender, radiating, from a few inches to 2 feet long, prostrate and rooting from the nodes or geniculately ascending, many-noded, simple or branching here and there, the branches from the prostrate portion swollen at the base and covered with silkily hairy cataphylls, the internodes glabrous and smooth. Leaf-sheaths short, moderately firm, the lower pale, somewhat loose, the upper glaucous, tight, more or less softly ciliate at the junction with the blade; ligule reduced to a softly ciliate rim; blades narrowly linear, tapering to an acute point, $\frac{1}{2}$ -2 in. by $\frac{3}{4}$ -1 lin. (when flattened out), glaucous, firm, but hardly rigid, those of compact tufts tightly involute, quite glabrous except at the base, smooth, finely and closely nerved. Panicle exserted, oblong to ovate in outline, $\frac{3}{4}-1\frac{1}{2}$ in. by $\frac{3}{4}-1$ in. when quite open, very loose, divided up to the third degree, quite glabrous except for some axillary hairs, all divisions finely filiform, slightly wavy, almost smooth; primary branches 6-8, solitary, $\frac{1}{2}$ -1 in. long, the lower divided again, the branchlets forming downwards compound or simple 5-2-spiculate loose racemes; pedicels very slightly thicker upwards, the lateral very short to almost 1 lin. long. Spikelets oblong, obtuse to subacute, $\frac{3}{4}$ lin. long, at length more or less gaping, pale with greenish nerves, glabrous. Glumes similar but unequal, thinly membranous; lower obliquely ovate in profile, shortly acute, one-third to one-half the length of the upper floret, up to 5-nerved, side-nerves short to very short; upper obliquely and broadly oblong, obtuse to subacute, 5- to sub-7-nerved. Lower floret barren: valve very similar and equal to the upper glume, obtuse, 5-nerved, side-nerves close; valvule shorter, oblong, subacute with rather narrow flaps. Upper floret &, elliptic-oblong, obtuse, \frac{1}{2} lin. long, whitish, smooth, glossy.—Durand & Schinz, Consp. Fl. Afr. v. 761.

Nile Land. Socotra: near Galonsir and Tamarida, $\mathit{Balfour},\ 130!$ 561! $\mathit{Schweinfurth},\ 346!$

66. P. subflabellatum, Stapf. Perennial, quite glabrous, 1 ft. high, cæspitose from a short rhizome, emitting very numerous root-fibres, with glabrous extravaginal innovation-buds. Culms erect, very slender, wiry below, terete, glabrous and smooth, 6–8-noded, branched from all but the lower 2 or 3 nodes; branches subfastigiate, obliquely erect and pushing the supporting sheath away from its

internode, frequently branching again in the same manner. Leafsheaths firm, at first tight, soon slipping off the culm, finely striate, $\frac{2}{3}$ -1 in. long, smooth, the lowest more or less persistent; ligule a minutely ciliolate rim; blades linear from a hardly widened base, tapering to a slender subobtuse point, involute, 1-2 in. by over 1 lin. (when unfolded), rigid, erect, smooth, closely nerved, midrib and primary lateral nerves (2 on each side) very slender. Panicle narrow, $1-1\frac{1}{4}$ in, long, at length distinctly exserted, divided to the third degree, all the divisions finely filiform, flexuous and like the primary axis smooth, in the mature state very closely contracted; primary branches solitary or irregularly approximate to pseudo-verticillate, sparingly branched from low down, rarely undivided for more than 4 lin., the lowest $1-\frac{1}{2}$ in. long; pedicels with slightly thickened tips, the lateral extremely short or up to 1 lin. long. Spikelets turgid, obliquely ovate-elliptic in outline, more or less gaping, 1 lin. long, pale. Glumes dissimilar, membranous; lower very broadly ovate, acute, one-third to almost half the length of the spikelet, appressed, 3-5-nerved, lateral nerves (at least the inner) exceeding half the glume; upper obliquely oblong in profile, subobtuse (when flattened out acute), 5-nerved, nerves fine, slightly prominent. Lower floret 3: valve very similar to the upper glume, 7-nerved, the inner side-nerves much shorter than the outer and joined to the midnerve; valvule broad, subacute, shorter than the valve. Upper floret $\mbegin{aligned} \mbox{$\searrow$}, & \mbox{oblong}, & \mbox{subacute}, & \mbox{$\frac{3}{4}$} & \mbox{lin.} & \mbox{by} & \mbox{$\frac{1}{8}$} & \mbox{lin.}, & \mbox{whitish}, & \mbox{glossy} & \mbox{and} \\ \end{aligned}$ smooth.

Mozambique Distr. Portuguese East Africa: West Luabo Mouth of the Zambesi, Kirk (May, 1858)!

TX Colorator

67. P. porphyrrhizos, Steud. Syn. Pl. Glum. i. 72. Perennial, up to over 3 ft. high, densely tufted, on a short rhizome with elongateconical extra- (and intra-?) vaginal innovation-buds which are covered by glabrous firmly scarious cataphylls. Culms moderately stout, erect or slightly geniculate and suberect, simple, 4-5-noded, internodes mostly long-exserted, terete, quite glabrous and smooth. Leaves glabrous or very sparsely hirsute, with tubercle-based hairs, particularly towards the basal margins of the blade; sheaths tight, more or less firm, striate particularly the basal; ligule very short, subhyaline, sparingly ciliolate; blades linear-lanceolate from an equally wide base, long-tapering to a hard slender point, 5-8 in. by 2-3 lin., or the lower linear-lanceolate, 1-4 in. by 3-5 lin., flat or convolute firm and rigid, smooth, very closely nerved, midrib and primary lateral nerves very slender and often obscurely differentiated. Panicle at first contracted and slightly nodding, ultimately quite erect, widely open and very loose, 9 to over 12 in. long and up to over 6 in. wide, quite glabrous, divided to the fourth or fifth degree, all the divisions finely filiform to capillary and scaberulous; primary axis 66+ P. striatissimum Hubb



slender, prominently striate, subterete and more or less smooth below, angular and scabrid upwards; primary branches solitary or approximate in pairs or whorls, the lower widely distant, half to two-thirds the length of the panicle, at length spreading at an angle of up to 45°, very loosely divided from 2-1 in. above the base, secondary branchlets up to over 2 in. long, more or less spreading, branching again after the manner of the primary, but permanently contracted, penultimate divisions usually 2-spiculate; pedicels with subcupular tips, the lateral of a pair very short to 1 lin. long, the terminal up to 4 lin. long. Spikelets lanceolate-oblong, with an acute and slender acumen, $1\frac{3}{4}$ -2 lin. long, broadly rounded on the back, green or tinged with dull purple, glabrous. Glumes very unequal; lower broadly ovate, acute or obtuse, when flattened out wider than high, onequarter to one-fifth the length of the spikelet, hyaline, 1-nerved or almost nerveless except for some extremely short side-nerves; upper corresponding in shape and size to the spikelet, membranous, acumen subulate, 7-9-nerved, nerves prominent upwards. Lower floret of or more often barren; valve as long or almost as long as the upper glume and very like it; valvule shorter, elliptic-oblong to oblong, acute; anthers if present rudimentary or perfect and up to $1\frac{1}{2}$ lin. long. Upper floret \(\xi\), elliptic-oblong when ripe, subacute, up to over $1\frac{1}{4}$ lin. by $\frac{5}{8}$ lin., pale brown, smooth and glossy; valve and valvule thinly crustaceous.—P. confine, Hochst. ex Steud. l.c. P. jumentorum, A. Rich. Tent. Fl. Abyss. ii. 373; not of Jacq. P. maximum, Durand & Schinz, Consp. Fl. Afr. v. 753 (partly); not of Jacq. P. virgatum, K. Schum. in Engl. Pfl. Ost-Afr. C. 103; not of Linn.

Nile Land. Sudan: Fazogl, Figari! Abyssinia: Gallabat; Matamma, by ditches, Schweinfurth, 1144! 1160! Tigre; Gafta, Schimper, 1230! Amogai, in marshes, 6800 ft., Schimper, 1096! Shire, without precise locality, Schimper, 1808!

68. P. coloratum, Linn. Mant. i. 30. Perennial, cæspitose, up to 4 ft. high, with intravaginal innovations which sometimes grow out into short ascending stolons. Culms more or less stout and erect or ascending from a geniculate often decumbent and branched base, with the suprabasal portion simple or sparingly divided, rarely finely hirsute below the nodes, mostly exserted from the sheaths. Leaf-sheaths terete, striate, glabrous or more or less hirsute, the lowest pale, scarious and loose, the upper subherbaceous and tight; ligule a membranous ciliolate rarely subeciliolate or densely ciliate rim; blades linear to lanceolate-linear from a usually slightly rounded and constricted base, 5 to over 12 in. by 3–6 lin., flat, slightly rigid or flaccid, glabrous and smooth or sparsely hairy, green or more or less glaucous, margins finely cartilaginous, smooth below except for the tubercles of deciduous hairs, scaberulous towards the tips, midrib marked by a white band on the upper side, otherwise usually not

conspicuous, primary nerves very slender, 3-8 on each side. Panicle erect or nodding, contracted or widely open, oblong or obovate, from 4 to over 12 in. (mostly over 6 in.) long, and when guite open up to over 6 in. wide and very loose, quite glabrous, divided up to the fourth degree, all divisions finely filiform to capillary, straight or flexuous, upwards angular and scaberulous; primary axis very slender, terete, striate or grooved and angular, scaberulous to scabrid or smooth below; primary branches solitary or approximate in pairs or false whorls, distant, the lowest about three-quarters the length of the panicle, loosely divided, in large panicles the lower often from $1-2\frac{1}{2}$ in. above the base, with the branchlets up to 2 and even 3 in. long, penultimate divisions forming very loose 3-2-spiculate racemes; pedicels with cupular tips, the lateral $\frac{1}{2}-1\frac{1}{2}$ lin. long. Spikelets oblong, acute or acutely acuminate, $1-\frac{1}{2}$ lin. long, not or moderately gaping except during flowering, glabrous, green or tinged with purple. Glumes very unequal, membranous; lower very broadly ovate, clasping, acute, one-quarter to one-third the length of the lower floret, very thin, midnerve percurrent, sidenerves 1-2 on each side or 0, very short and fine; upper corresponding in size and shape to the spikelet, 7-9-nerved, nerves prominent upwards. Lower floret 3: valve like the upper glume; valvule as long as or slightly shorter than the valve; anthers $\frac{3}{4} - \frac{4}{5}$ lin. long. Upper floret $\[\]$, narrow, oblong, subacute, up to $\[\]$ lin. by 3 lin., yellowish or bright yellow, quite smooth and glossy; valve and valvule crustaceous.—Kunth, Enum. i. 104; Trin. Pan. Gen. 182, and in Mém. Acad. Pétersb. 6me sér. iii. 270; Fig. et De Not. in Mem. Ac. Torin. ser. ii. xiv. 355; Steud. Syn. Pl. Glum. i. 73; Schweinf. Beitr. Fl. Aethiop. 300, and in Bull. Herb. Boiss. ii. App. ii. 22, 95; Boiss. Fl. Or. iv. 440; Aschers. & Schweinf. Ill. Fl. Egypte, Suppl. 778; Durand & Schinz, Consp. Fl. Afr. v. 743 (partly); Stapf in Dyer, Fl. Cap. vii. 409; Cheval. Sudania, 161; Eyles in Trans. Roy. Soc. S. Afr. v. 299.

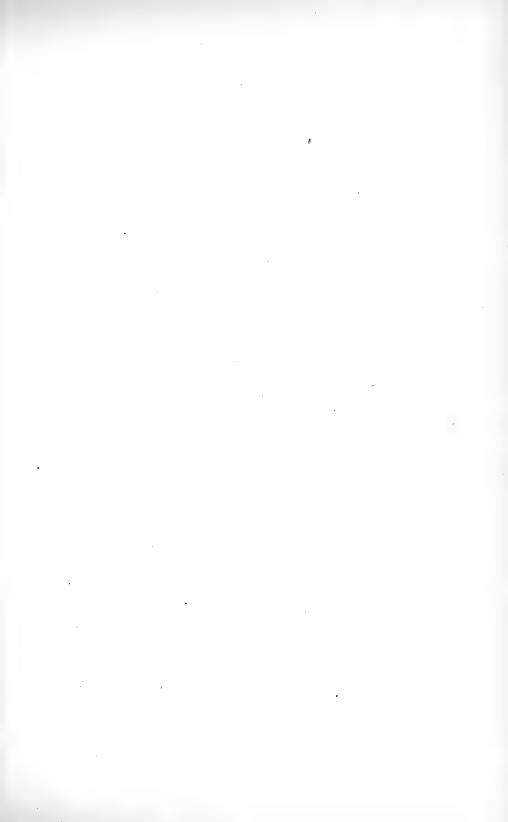
Upper Guinea. Northern Nigeria: Sokoto, in moist waste places, fields, edges of marshes, etc., Dalziel, 483!

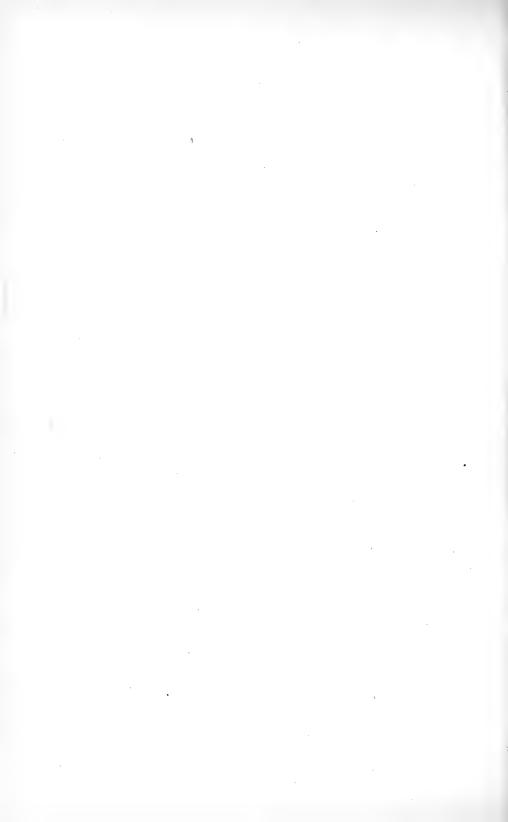
North Central. Bagirmi: Tchecma, Chevalier, 9544!

Lower Guinea. Angola: Malange District, Gossweiler, 1488!

Mozambique Distr. Portuguese East Africa: between Lupata and Tete, Kirk! Shupanga, Kirk! Mazzaro, Kirk! 30 miles below the Shire Falls, Meller, 4! Nyasaland: near Zomba, 2500–3500 ft., Whyte! Rhodesia: Mashonaland; Salisbury, Mrs. Craster, 34! Bechuanaland; Eastern Bamanguato Territory, Holub! Matabeleland; Insiza District, Mundy! Victoria Falls, Rogers, 5068. Southern Rhodesia: without precise locality, Walters, 2234!

Durand & De Wildeman (Mat. Fl. Congo, i. 44; Reliq. Dewevr. 256; Études Fl. Bas- et Moyen Congo, i. 94, and Miss É. Laurent, 200) have indicated this species from several localities in the Belgian Congo (Boma, Dewévre; Cataracts, Lutété, Hens, A. 245, and A. 279; Stanley Pool Div., between Leopoldville and Sabuka, M. Laurent, and Kisantu, Gillet, 1510; Kasai Div.; Island in the lower Sankuru, É. Laurent). The only specimen, however, which I have seen of this series is Hens, A. 279, and that is P. phragmitoides, Stapf.





Var. minus, Stapf ex Chiov. in Result. Scient. Miss. Stefanini-Paoli, i. Bot. Coll. 183, 226. Culms slender, springing from short wiry stolons, the overground part usually starting with a bundle of branches or secondary culms, these not much over 1 ft. high, slender, 2-4-noded, with the uppermost node below the middle; leaves nearly always glabrous or nearly so, blades rarely up to 6 in. long, not over 2 lin. wide, more or less rigid and glaucous. Panicle erect, usually not much over 3 in. (rarely up to 9) long.—P. coloratum (forma minor), Stapf in Kew Bulletin, 1907, 214. P. repens, Stapf l.c. P. maximum, var. confine, Chiov. in Ann. Istit. Bot. Roma, viii. 33, 306 (excl. syn.).

Nile Land. Eritrea: Dembelas; Mantai on the upper Barka River, Schwein-Mile Land. Eritrea: Dembelas; Mantai on the upper Barka River, Schweinfurth, 15. Assaorta; Mount Gheden, Terracciano & Pappi, 2634. Amasen; Ghinda-Baresa, 3300 ft., Terracciano & Pappi, 117. Dongollo, near Ghinda, Pappi, 4281; Mai-Atal-Dongollo, Tellini, 1583; Sabarguma Dongollo, Tellini, 1685; Anseba torrent on the Ghinda plateau, Tellini, 558. British Somaliland: Golis Range, Drake-Brockman, 98! 491! 493! near water at Bohotle, Buras and Upper Sheikh, Appleton! Italian Somaliland: Dafit, between Wanle Wen and Ilduk Wen, Paoli, 1270; dunes near Brava, Mangano; near Merca, Provenzale. British East Africa: Nairobi, Lyne, 153! Ukambani, sunny sayanas on laterite 3300 ft. Scheffer, 199! savanas on laterite, 3300 ft., Scheffler, 199!

Mozambique Distr. German East Africa: Usambara; west of the Pare

Mountains, 650 ft.. Höhnel, 24!

In habit rather different from typical P. coloratum, but probably nothing more than a xerophytic modification from a dryer region.

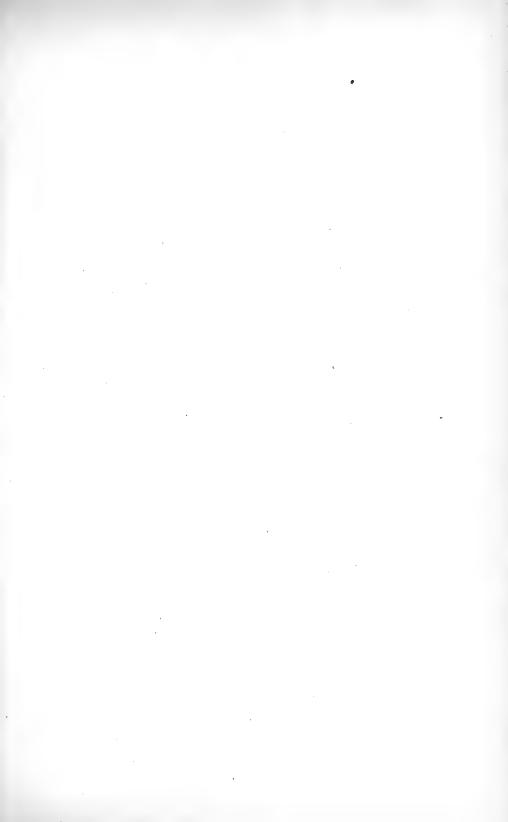
69. P. Schinzii, Hack. in Verhandl. Bot. Ver. Prov. Brandenb. xxx. 142. Annual, tufted, over 2 ft. high. Culms erect and straightor subgeniculate, 2-3-noded, branched from the lowest 1 or 2 nodes, with the branches erect and subfastigiate, terete, soft and compressible, finely striate or here and there sulcate, glabrous and smooth, up to over 1½ lin, in diam, towards the base. Leaf-sheaths shorter than the internodes, rather tight, striate, smooth and glabrous except at the delicately pubescent nodes; ligule reduced to a ciliate narrow membranous rim; blades linear from a broadly rounded semiamplexicaul base, long-tapering to a fine point, up to over 6 in. by 3-4 lin., flat, thin, flaccid, green, glabrous and quite smooth, also along the margins, midrib and primary lateral nerves (about 3 on each side) very slender. Panicle oblong to rotundate-obovate when fully opened out, loose, 6-7 in. by 2-5 in., divided to the fourth (rarely fifth) degree; primary axis slender, striate, smooth below, scaberulous upwards; primary branches solitary or approximate in pairs, obliquely erect or the lowest ultimately almost horizontal, somewhat stiff or flexuous, filiform, up to 6 in. long, mostly undivided for $\frac{1}{3}$ - $\frac{2}{3}$ in. from the base, then loosely and evenly branched, the following divisions often secund, directed outwards, very fine, scaberulous, forming slender loose downwards compound racemes, 2-1 in. long, of 8-6 or upwards fewer spikelets; pedicels very slightly thickened at the tips, lateral about \(\frac{1}{2} \) lin. long. Spikelets oblong, shortly acuminate or apiculate, slightly gaping when mature, slightly over 1 lin. long, glabrous, greenish or tinged with brown. Glumes very thinly membranous, unequal, often persistent until after the shedding of the fruit and then falling one after the other; lower appressed or at length somewhat spreading, broadly ovate, acute, clasping,

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subhyaline, 1-nerved or with a minute rudimentary nerve on each side; upper obliquely oblong in profile, subacuminate, as long as the spikelet, 7–9-nerved, nerves anastomosing upwards and more or less prominent in the dry state. Lower floret \mathcal{J} : valve very like the upper glume and equal in size, 7-nerved; valvule oblong, obtuse, flaps rather wide in the lower third; anthers purple, $\frac{3}{4}$ -lin. long. Upper floret $\not\subseteq$, oblong, subacute or almost obtuse, 1 lin. by $\frac{3}{8}$ lin., brown, glossy and smooth; valve and valvule subcoriaceous to crustaceous. Grain yellowish.—Durand & Schinz, Consp. Fl. Afr. v. 764; Hack. in Bull. Herb. Boiss. iv. App. iii. 15.

Lower Guinea. South Angola: in open forest near kilometre 108:5 on the Mossamedes railway, *Pearson*, 2861! and near kilometre 107 on the same railway, *Pearson*, 2368! Amboland: Olukonda, *Schinz*, 641! between Ondonga and Unkuanyama, *Rautanen*, 5!

70. P. hygrocharis, Steud. Syn. Pl. Glum. i. 72. Annual, tufted, up to over 2 ft. high. Culms slender to somewhat stout, soft, erect or geniculately ascending, sometimes from a short decumbent base, few- to 6-noded, more or less fastigiately branched or almost simple, smooth, glabrous like the whole plant, the internodes more or less equalling the sheaths, except the uppermost which is at length longexserted. Leaf-sheaths rather loose or slightly inflated, finely striate, very smooth; ligule a minutely ciliolate or obscure rim; blades linear from a slightly rounded or in robust specimens almost amplexicaul base, usually shortly tapering to a subacute slightly callous point, rarely long and finely attenuated upwards, 3-4 by $2\frac{1}{2}$ 4½ lin., occasionally up to 9 in. by 6 lin., flat, soft, when long more or less flaccid, pale to glaucous-green, quite smooth except along the finely scaberulous upper margins or somewhat rough on the back towards the tips, midrib almost as slender as the 3-5 primary lateral nerves, or the latter all but indistinct from the very close secondary nerves, or in large blades the midrib thickened downwards. Panicles erect or somewhat nodding, contracted or more or less open, moderately loose, 3-4 (rarely over 6) in long, divided to the fourth degree, all the divisions finely filiform, subangular and upwards slightly scaberulous or almost quite smooth; primary axis slender, angular, lower and intermediate internodes of unequal length, some up to over 1½ in. long; primary branches solitary and scattered or irregularly approximate in pairs or occasionally in false whorls, the longest often almost as long as the panicle, divided from a few lines to over 1 in. above the base; secondary branches rather long (to over $1\frac{1}{2}$ in.), their divisions contracted with the penultimate divisions forming slender or short 3-2-spiculate racemes, the spikelets irregularly scattered or approximate; pedicels slightly widened upwards with truncate-clavellate tips, the lateral \(\frac{1}{2}\)-2 lin. long. Spikelets oblong, acutely apiculate, up to 1½ lin. long, pale greenish. Glumes very unequal; lower broadly ovate from a clasping base, shortly



+ Burney Commence acute to obtuse or rounded, from less than a quarter to over a third the length of the spikelet, subhyaline to hyaline, with a very fine percurrent midnerve and with or without obscure and short sidenerves; upper membranous, obliquely lanceolate-acute in profile, as long as the spikelet, 9-nerved, nerves usually not prominent or only so upwards. Lower floret or obarren; valve very similar and equal to the upper glume; valvule distinctly shorter than the valve, with narrow flaps throughout; anthers $\frac{3}{4}$ lin. long. Upper floret of oblines, subacute, up to over 1 lin. long, polished; valve and valvule thinly crustaceous.—Aschers. in Schweinf. Beitr. Fl. Aethiop. 300; Durand & Schinz, Consp. Fl. Afr. v. 751. P. aquaticum, A. Rich. Tent. Fl. Abyss. ii. 373; not of Poir. P. albidulum, Steud. Syn. Pl. Glum. i. 69; Durand & Schinz, l.c. 740. P. subalbidum, Hochst. ex Steud. l.c. 69; not of Kunth; Chiov. in Ann. Istit. Bot. Roma, viii. 34, 305. P. paludosum, Hochst. ex Steud. l.c. 72.

Nile Land. Cordofan: in dried up morasses near Abu Gerad, Kotschy, 42! Eritrea: Dembelas; along the Mai Ciagarit, Pappi, 6045! Beni Amer Carajai, Pappi, 6201. Barca; Agordat, Pappi, 2810. Abyssinia: in wet ditches near Ferras Mai, Schimper, 1786!

71. P. Swynnertonii, Rendle in Journ. Linn. Soc., Bot., xl. 230. Annual (?), 3-4 ft. high (base unknown). Culms slender, erect, soft, usually simple upwards or sparingly branched, more than 3- or 4noded, terete, quite glabrous and smooth, internodes rather longexserted. Leaf-sheaths tight, striate, glabrous or more rarely spreadingly hirsute, with tubercle-based hairs, prominently striate, nodes glabrous, dark; ligule a narrow membranous minutely ciliolate rim or quite obscure to obsolete; blades linear from a more or less constricted rounded base, tapering to a very long fine point, 5 to over 12 in. by 2-6 lin., flat, obliquely erect, green, glabrous or softly hirsute towards the base, smooth except upwards along the finely cartilaginous margins and dorsally towards the tips, midrib obscure or slender and whitish on the face, lateral nerves very numerous and close, 4-5 primary differentiated. Panicle oblong, mostly rather contracted, jubate, sometimes open, slightly flexuous or nodding, floribund, 6-10 in. long, divided to the fourth or fifth degree, all the divisions filiform to finely filiform, angular, finely scaberulous at least upwards; primary axis slender, terete or angular, striate, smooth below; primary branches usually in false whorls, at least in the lower part or solitary in weak panicles, the longest up to over three-quarters the length of the panicle, loosely divided from $\frac{1}{2}-2$ in. above the base; secondary branches long, their divisions loosely contracted, the penultimate divisions 4-2-spiculate forming rather loose racemes with their spikelets distant by more than their length; pedicels with minutely discoid tips, the lateral 1-2, the terminal to over 3 lin. long. Spikelets oblong, acutely acuminate, $1\frac{1}{4}$ lin. long, greenish, the tips often purplish. Glumes very unequal; the lower broad-ovate from a clasping base, acute in profile, a quarter to almost There was the work of the

half the length of the spikelet, subhyaline, 1- to sub-5-nerved, the lateral nerves short to very short; the upper as long as the spikelet, membranous, finely and prominently 7-9-nerved. Lower floret 3: valve very similar to the upper glume; valvule slightly shorter than the valve, subacute, sharply keeled, with narrow flaps all along; anthers $\frac{2}{3}$ lin. long. Upper floret $\noinde{\noinder}$, elliptic-oblong, $\frac{3}{4}$ to almost 1 lin. by $\frac{2}{5}$ lin., pale yellowish, polished; valve and valvule thinly crustaceous.—P. coloratum, var. cuanzense, Rendle in Cat. Afr. Pl. Welw. ii. 178. P. Merkeri, Mez in Engl. Jahrb. xxxiv. 144 (partly ?). ? sectrogeneut in Types

Lower Guinea. Angola: Pungo Andongo; Cuanze cataract near Condo, Welwitsch, 2833! and without precise locality, Welwitsch, 7355!

Mozambique Distr. Nyasaland: Zomba, 2500–3500 ft., Whyte! Portuguese East Africa: 30 miles below the Murchison Falls, Meller! near Shupanga, Kirk! below Mazzaro, in damp places, Kirk! between Lupata and Tete, Kirk! Rhodesia: Northern Melsetter, 2000–6000 ft., Swynnerton, 1702 a!

The type specimen is a rather weak plant as compared with the other specimens quoted above, but there is no structural difference. Mez's P. Merkeri was described from a plant collected by Merker in the neighbourhood of Kilimanjaro which I have not seen, and from Whyte's specimen quoted above. If the two plants should indeed be identical, Mez's name (1904) would have priority over P. Swynnertonii.

72. P. longijubatum Stapf. Perennial from a very short and early disintegrating rhizome up to over 4 ft. high, quite glabrous. Culms stout, soft, sometimes spongy, erect or geniculately ascending. 3-4- (rarely 5-) noded, rarely with a prostrate and rooting base and then many-noded, mostly simple, seldom with 1 or 2 branches, terete, quite glabrous and smooth, intermediate and upper internodes at length shortly exserted. Leaf-sheaths rather loose, striate, very smooth; ligule reduced to a narrow ciliolate membranous rim; blades linear from a usually slightly constricted base, long-tapering to an acute point, up to 1 ft. by 3-8 lin., flat or involute when drying. smooth or more or less rough upwards, particularly on the upper side, margins scaberulous to scabrid upwards, midrib conspicuous only in broad blades and then whitish above, primary lateral nerves up to 8 on each side, slender, prominent. Panicle erect or slightly nodding, usually contracted and narrow, sometimes ultimately widely open and very loose, 6 to over 12 in. long, divided to the fourth (rarely fifth) degree, all the divisions filiform to finely filiform, angular, scabrid; primary axis slender, terete, grooved and smooth below, angular and rough upwards; primary branches solitary and scattered or irregularly approximate in pairs or occasionally in whorls, the longest up to three-quarters the length of the panicle or occasionally as long as it, spreading at maturity at an angle of mostly under 30°, very loosely divided from 1-2 in. above the base; lowest secondary branches of large panicles 5-3 in. long, their divisions like the shorter secondary branches contracted (also on maturity) with the penultimate divisions forming short 3-2-spiculate racemes, their spikelets

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distant by less than their own length; pedicels slightly widened upwards with truncate tips, the lateral $\frac{1}{2}$ - $1\frac{1}{2}$ lin. long. Spikelets lanceolate to lanceolate-oblong, acutely acuminate, 11 lin. long, pale greenish. Glumes very unequal; lower broadly ovate, clasping, acute to subobtuse, a quarter to one-third the length of the spikelet, subhyaline, imperfectly 3-6-nerved, the midnerve percurrent, the side-nerves very short to (the inner) half as long as the glume, obscurely anastomosing; upper corresponding in size and shape to the spikelet, membranous, prominently 7-9-nerved. Lower floret barren, with or without a more or less reduced valvule; valve like the upper glume, mostly 9-nerved. Upper floret $\mbox{$\mbox{$\sc y$}$}$, oblong, subacute, 1 lin. by almost $\frac{1}{2}$ lin., smooth, glossy, yellowish; valve and valvule thinly crustaceous. Anthers $\frac{1}{2}$ lin. long. Grain over $\frac{1}{2}$ lin. long, white.—P. paludosum, Nees, Fl. Afr. Austr. 35; Durand & Schinz, Consp. Fl. Afr. v. 758; not of Roxb. P. proliferum, vars. longijubatum and paludosum, Stapf in Dyer, Fl. Cap. vii. 406, 407; Wood, Natal Pl. t. 159; Pobéguin, Ess. Fl. Guin. Franç. 214; Cheval. Sudania, 32; Chiov. in Ann. Istit. Bot. Roma, viii. 306, and in Result. Scient. Miss. Stefanini-Paoli, i. Bot. 226. P. miliare, Cheval. Sudania, 159; not of Linn.

Upper Guinea. Sierra Leone: Bumba, Thomas, 1938! French Guinea: Kouroussa, very common, *Pobeguin*, 488! French Sudan: Middle Niger; between Sebé and Mopti, *Chevalier*, 2192! 2198! 2199! Sebu, abundant on river banks, Lécard, 206! Gold Coast: Christiansborg, Johnson, 1028! 1032! Northern Nigeria: Katagum District, Dalziel, 289! Sokoto, Dalziel, 1483! North Central. Bagirmi: Nigui, Chevalier, 9453! Albougher, Chevalier,

9686 (Herb. Kew)!

Nile Land. Eritrea: Sarae; Gaza-Gobo, 5900–6500 ft., Pappi, 155, 208. Italian Somaliland: Jub Valley, Scassellati & Mazzochi. British East Africa: by streams between Kisumu and Nairobi, Dummer, 1514!

Lower Guinea. Belgian Congo: Stanley Pool Div.; Chenul, Vanderyst, 5173!

Kwango Div.; Bandundu, Vanderyst, 5160!
Mozambique Distr. German East Africa: Usambara; Kwa Mshuza, Holst, 9020! Ujiji (?); flooded meadows near Gonda, Böhm, 36! 166! Nyasaland: Elephant Marsh, Kirk!

Also in South Africa.

The P. proliferum of authors covers a number of allied yet clearly distinct species. The name is Lamarck's, but since Hitchcock (in Contrib. U.S. Nat. Herb. xii. 147) has shown that his plant so named is identical with P. miliare. Lam., P. proliferum becomes a synonym unconnected with any of the forms so far referred to it. Of these, one, namely Hooker's *P. proliferum*, (Fl. Brit. Ind. vii., 50), is identical with Roxburgh's *P. paludosum* (Roxb. Fl., Ind. ed. Carey, i. 310), another, a native of America, is *P. dichotomiflorum*, Michx (Fl. Bor. Am. i. 48). Both appear to me sufficiently distinct from the African plant described above; P. paludosum mainly by its conspicuously larger and more finely acuminate spikelets; P. dichotomiflorum by its pronounced branching habit and the smaller

number of nerves of the upper glume (mostly 7) and lower valve (5-7, mostly 5).

73. P. pectinatum, Rendle in Trans. Linn. Soc. ser. 2, Bot. iv. 54. Perennial, compactly cæspitose, up to 2 ft. high, with intravaginal innovations. Culms very slender, erect, terete, 1-2-noded, uppermost internode at length more or less exserted, glabrous and smooth.

Leaf-sheaths tight, terete or the lowest subterete, very closely and prominently striate, tomentose at the nodes, the basal otherwise more or less densely pubescent, the upper less so to subglabrous with short clavellate gland-tipped hairs among the finer and acute hairs, or the latter absent; ligule a ciliolate rim; blades linear from an equally wide base, gradually tapering to a subacute slightly callous point, up to 3 in. by 1-2 lin., flat or the basal setaceously convolute, green, somewhat thickly herbaceous, loosely pubescent on both sides, hairs white, fine, here and there intermixed with a few gland-tipped clavellate hairs, margins scabrid, midrib and nerves very fine and close. Panicle erect or slightly nodding, open and then obovate and very loose or more or less contracted, 3-5 in. long, divided to the third degree, bearing on the common axis and all or most of its divisions spreading hairs with clavellate glandular tips, more rarely glabrous upwards; common axis filiform, terete, slightly striate, smooth, glabrous except for the gland-tipped hairs, or shortly pubescent downwards, lower internodes $\frac{1}{2} - \frac{3}{4}$ lin. long; primary branches finely filiform to flexuous, very loosely divided from the base or near it, terete, smooth, the longest up to over 3 in, long, scantily and distantly divided from the base, lowest branchlets up to 1 in. long; pedicels very unequal, $1\frac{1}{2}$ -6 lin. long, very flexuous, with gland-tipped hairs only or quite glabrous, slightly thickened towards the subdiscoid tips. Spikelets oblong, subacute or obtuse, slightly dorsally compressed, $1\frac{3}{4}$ to almost 2 lin. long, green or tinged with purple, glabrous. Glumes unequal, membranous, finely prominently nerved, dentate; lower broadly ovate, one-third to almost half the length of the upper floret, 3-4-nerved, with the nerves running into as many narrow acute subterminal teeth; upper broadly oblong, equalling about three-quarters of the spikelet, 5-nerved and shortly and very acutely 5-toothed, with few delicate transverse nerves. Lower floret barren, reduced to a valve which is lanceolate in profile and oblong in back view, with a blunt minutely 3-toothed top and as long as the fertile floret, nerves 7 with few transverse venules upwards. Upper floret $\mbox{\normalfont{$\normalfont{\searrow}}}$, oblong or lanceolate-oblong, subobtuse, whitish; valve and valvule thinly papery, the valve softly pubescent near the tip; anthers 1 lin. long.—K. Schum. in Engl. Pfl. Ost-Afr. C. 103.

Mozambique Distr. Nyasaland: Mount Mlanje, Whyte! Mount Malosa, 4000-6000 ft., Whyte! and without precise locality, Buchanan, 996!

74. P. pectinellum, Stapf. Annual (?), up to almost 2 ft. high. Culms very slender, erect or subgeniculate at the base, up to 9-noded, upper internodes long, the others shortly or not exserted, simple or nearly so, glabrous or pubescent towards the nodes, with a few clavellate gland-tipped hairs here and there. Leaf-sheaths terete, tight, prominently striate, scantily to densely pubescent, with spreading tubercle-based hairs mixed with a few gland-tipped ones;

73+ P. Kateatanieuse Robyns Cougr

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74+ P. catangense Chiov. see p. 735

14 t O. lukwangulense

ligule a densely ciliolate rim; blades lanceolate-linear to linear from a very slightly rounded base, tapering to a very acute point, 2-3 in. by 2-3 lin., spreading, flat, thickly herbaceous, greyish-green, very scabrid above and along the margins, densely pubescent below, midrib and nerves fine, prominent or almost lamellate above, much less conspicuous below. Panicle long-exserted, open and loose, ovate to broad elliptic-oblong in outline, 4-5 in. by 2-3 in., divided to the fourth degree, bearing on the common axis and all its divisions short ' fine spreading hairs with clavellate glandular tips, otherwise glabrous; common axis filiform, angular, smooth, lower and intermediate internodes mostly 8-5 lin. long; primary branches solitary, loosely divided from the base, sometimes forming imperfect false whorls, longest up to $2\frac{1}{2}$ in. long, finely filiform, flexuous, terete, smooth, secondary branchlets similarly divided, up to over 1 in. long, capillary; pedicels $1-2\frac{1}{2}$ lin. long, very fine, flexuous, very slightly thickened towards the tips. Spikelets oblong, subacute, hardly compressed, \(\frac{4}{5}\) to almost 1 lin. long, green, tinged with purple, glabrous. Glumes unequal, membranous, prominently nerved; lower a small roundish shortly 3-toothed scale, 3-nerved, $\frac{1}{6} - \frac{1}{5}$ lin. long; upper subquadrate, with 5 fine acute teeth, four-fifths to half the length of the spikelet, with 1 nerve for each tooth and a faint intermediate nerve here and there. Lower floret barren, reduced to a broad-oblong valve four-fifths to five-sixths the length of the spikelet, with 5-7 short teeth and as many nerves. Upper floret \(\noting\), oblong, acute, smooth, whitish or suffused with purple, as long as the spikelet; valve and valvule thinly papery, the valve finely pubescent at the tip.

South Central. Belgian Congo: Katanga; near Elisabethville, on dry wooded ground, Homblė, 54!

75. P. acrotrichum, Hook. f. in Journ. Linn. Soc., Bot., vii. 226. Perennial (?), base unknown. Culms very slender, erect or geniculately suberect, apparently 4- or more-noded, sparingly branched, terete, glabrous and smooth, upper internodes 3-5 in. long. Leafsheaths tight, terete, prominently finely striate, densely ciliate, otherwise glabrous, smooth; ligule reduced to a minutely ciliolate rim; blades lanceolate from a rounded and much constricted to subpetiolate base, finely acuminate, about 3 in. by 6-8 lin., spreading, flat, thin, green, very sparingly and finely hairy, margins scaberulous, midrib very slender, whitish below, primary lateral nerves 3-4, very fine and distant, distinct below only, secondary nerves 5-7 in the intervals connected by delicate cross-veins. Panicle exserted, erect, somewhat flexuous and delicate, 3-6 in. long, contracted or more or less open, divided to the third degree; common axis terete, filiform, smooth, lowest internodes 1-2 in. long, lower primary branches solitary or 2-nate, divided from $\frac{3}{4}-1\frac{1}{2}$ in. above the base, finely filiform, subangular, like the higher divisions smooth, or very slightly

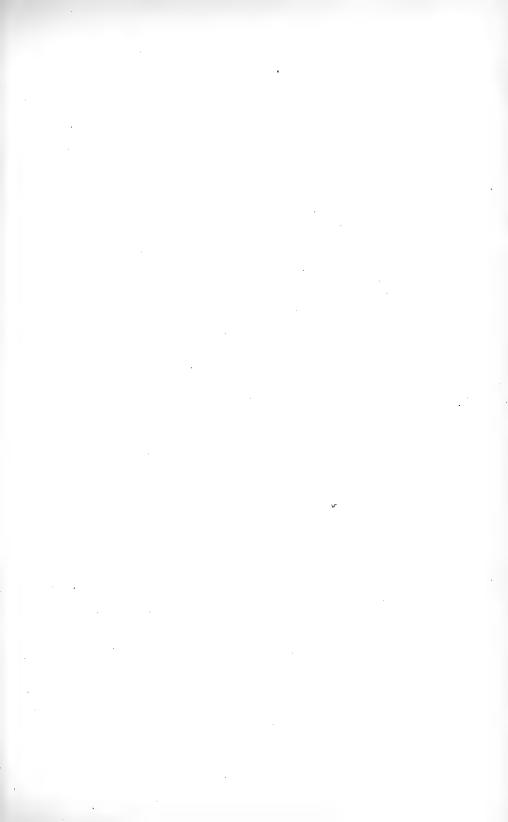
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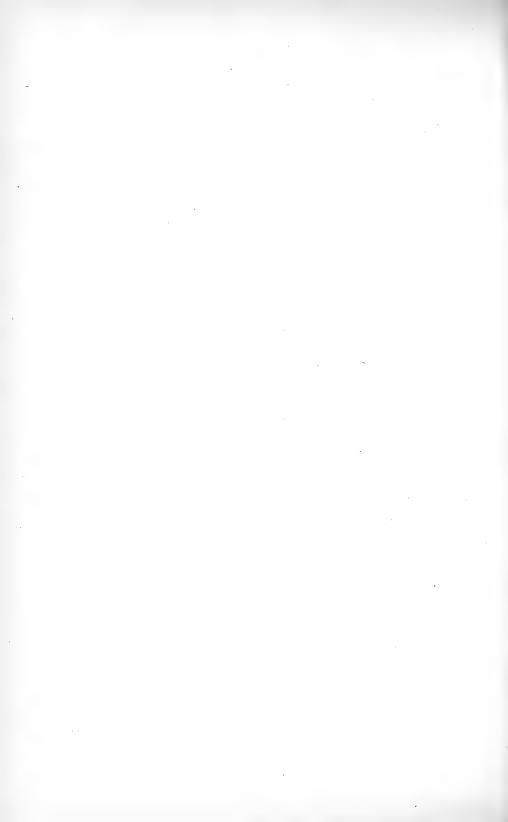
rough upwards, lower internodes long; secondary branchlets capillary, bearing 4–1 spikelets approximate upwards; pedicels very short to $1\frac{1}{2}$ lin. long, with truncate tips. Spikelets shortly lanceolate, acute, $1-1\frac{1}{4}$ lin. long, green with an apical tuft of fine long hairs from the upper glume. Glumes thinly membranous, unequal; lower lanceolate, acute, half the length of the spikelet or less, 1–3-nerved or almost nerveless, glabrous; upper corresponding in length and outline to the spikelet, 5–7-nerved, with some scattered short hairs on the back and sides and a slender tuft of long ones (up to $1\frac{1}{2}$ lin.) from the tip. Lower floret barren; valve very similar to the upper glume; valvule reduced to a tiny hyaline scale. Upper floret $\mbox{\ensuremath{\notred}}$, oblong, acute with a broad back, 1 lin. long, smooth, yellowish or whitish; valve and valvule papery; anthers $\frac{2}{3}$ lin. long.—Durand & Schinz, Consp. Fl. Afr. v. 740.

Upper Guinea. Cameroons: Cameroon Peak, Mann, 2100!

76. P. monticolum, Hook. f. in Journ. Linn. Soc., Bot., vii. 226. Perennial, up to over 1 ft. high. Culms very slender, geniculately erect from a prostrate rooting branched base, simple or very sparingly branched above it, terete, glabrous and smooth, up to 7- or morenoded. Leaf-sheaths tight, terete, subherbaceous, finely and prominently striate, densely ciliate, otherwise glabrous and smooth; ligule reduced to a minutely ciliolate rim; blades lanceolate from a much constricted to almost petiolate base, acutely acuminate, about 1½ in. by 5-6 lin., spreading, flat, very thin, green, quite glabrous or here and there with a few fine tubercle-based hairs, margins very scabrid, midrib very fine, primary lateral nerves delicate, 2-3 on each side, distant, with 4-5 secondary nerves between, connected by more or less distinct cross-veins. Panicles shortly exserted, flexuous, 2 to over 3 in. long, somewhat contracted, rather scanty, somewhat irregularly divided and rarely beyond the second degree: common axis filiform, terete and like all its divisions glabrous and smooth or almost so, internodes few, up to over \(\frac{3}{4}\) in. long; primary branches obliquely erect to subcreet, the lowest up to $1\frac{1}{2}$ in. long, bearing from low down or the lowest from some distance above it few remote or approximate spikelets, or owing to abortion bare high up; pedicels very short to over 2 lin. long (sometimes the terminal). Spikelets oblong, acute, up to over 1½ lin. long, pale green, faintly suffused with pink, glabrous. Glumes thinly membranous, unequal; lower broad-ovate, obtuse, 1-nerved or nerveless; upper corresponding in length and outline to the spikelet, 5-nerved. Lower floret reduced to a valve very like the upper glume. Upper floret \mbeta , oblong, acute, $1\frac{1}{4}$ lin. long, yellowish, smooth; valve and valvule subcoriaceous; anthers \(\frac{3}{4}\) lin. long.—Durand & Schinz, Consp. Fl. Afr. v. 755.

Upper Guinea. Cameroons: Cameroon Peak, 7000 ft., Mann, 1353!





77. P. calvum, Stapf. Apparently a rambling perennial, several Culms very slender from a geniculate subprostrate or ascending base, rooting from the lower nodes, many-noded and with long ascending or suberect branches, terete, very smooth, glabrous, internodes 2-5 in. long, of the flowering culms mostly exserted. Leaf-sheaths tight, terete, prominently finely striate, quite glabrous and smooth; ligule a very narrow membranous rim; blades lanceolate to linear-lanceolate from a rounded and much constricted or subpetiolate base, finely acuminate, 2-4 in. by 3-8 lin., spreading, flat, thin, green, loosely and appressedly hairy to glabrous, margins scaberulous, midrib slender, whitish below, primary lateral nerves 3-4, very fine and distant, distinct on both sides or at least below, secondary nerves 5-8 in the intervals, connected by distinct cross-veins. Panicle exserted, often long, erect, flexuous or ultimately stiff, about 6 in. by 4-8 in., opening widely and very loose, divided to the third or fourth degree; common axis terete, very slender to subfiliform, smooth and glabrous, lowest internodes usually not much over 1 in. long; primary branches mostly very loosely divided from the base, forming false whorls, or 2-nate branches, filiform, like the following divisions smooth or very slightly rough upwards, the longest up to over 4 in. long, internodes $1-\frac{1}{2}$ in. long (sometimes up to 2 in.), secondary branchlets similarly divided, ultimate divisions subcapillary, bearing few much scattered spikelets; pedicels very unequal, very short to 4 lin. and even 6 lin. long, with minutely discoid Spikelets lanceolate-oblong, acute, about $1\frac{1}{4}$ lin. long, green, quite glabrous. Glumes thinly membranous, very unequal; lower lanceolate, acute, 1-3-nerved, two-thirds to three-quarters the length of the spikelet; upper corresponding in length and outline to the spikelet, 7-nerved. Lower floret reduced to a valve, very similar to the upper glume but 5-nerved. Upper floret &, oblong, acute, up to 1 lin. long, pale, smooth and polished; valve and valvule papery; anthers \frac{1}{2} lin. long.

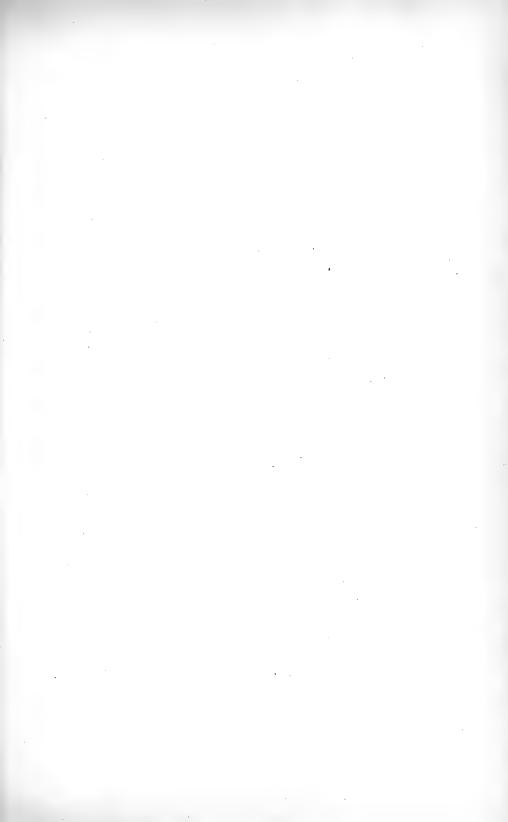
Nile Land. Uganda: Ruwenzori; in shady forest near Kivata, 6000-8000 ft., Scott Elliot, 7647! 7686! Mt. Elgon; in thickets about Butalivi, 5000 ft., Dummer, 3727! British East Africa: Aberdare forests, 7500 ft., Battiscombe, 685!

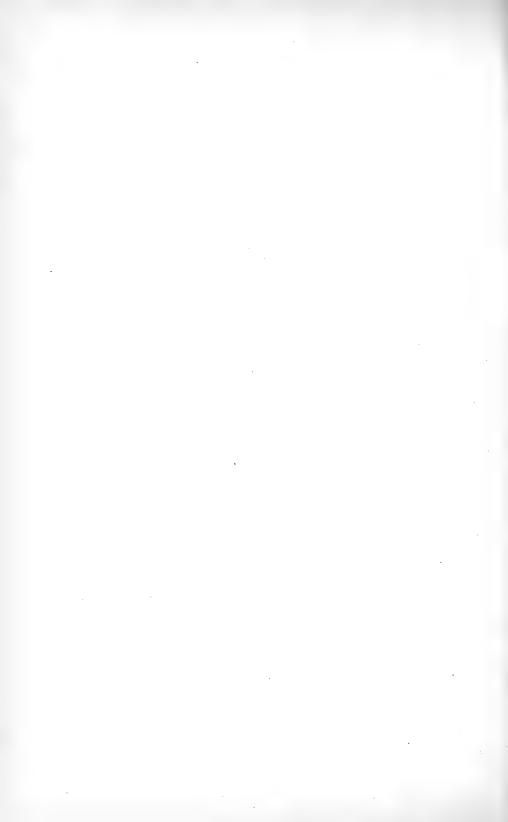
78. P. subobliquum, Stapf. Annual (?), base unknown, apparently several ft. high. Culms many-noded, sparingly branched, slender, glabrous and smooth, intermediate internodes up to 6 in. long and bared at the base by the fall of the sheath, upper shorter. Leaf-sheaths tight, prominently striate, densely ciliate upwards, minutely pubescent in the grooves, those supporting branches thrust aside by the branch and ultimately thrown off, leaving an irregular cuff-like base behind; ligule a narrow membranous ciliolate rim; blades lanceolate to linear-lanceolate from a rounded and much constricted base, tapering to a long often linear acute acumen, 2–6 in. by 7–11 lin.,

obliquely erect, flat, thin, somewhat rigid, green, minutely and appressedly hairy to subglabrescent, with minutely tubercle-based hairs, margins scaberulous, midrib fine, whitish below, primary lateral nerves very fine, 3-4 on each side, distant, with 4-6 secondary nerves in the intervals and fine cross-veins. Panicle emerging from the uppermost sheath, widening out upwards, up to 6 in. long, divided to the fourth degree; common axis very slender, angular, smooth below, like all its divisions scaberulous to scabrid upwards with a few fine long hairs here and there; internodes short low down, then $\frac{3}{4} - \frac{1}{2}$ in. long; lower branches finely filiform, up to over 3 in. long. divided like the secondary branches from the base or some distance above it, the latter subcapillary, 3-4 lin. apart, its divisions up to 4 or 5 lin. long, bearing 4-1 much scattered spikelets or in the lower part of the panicle barren, with small arrested spikelets; pedicels capillary, $\frac{1}{2}$ - $\frac{1}{2}$ (rarely the terminal 3) lin. long. Spikelets acutely lanceolate to lanceolate-oblong in back view, slightly oblique in profile, 1 lin. long, pale or greyish-green, loosely pubescent from the glumes. Glumes equally long, thinly membranous, very finely and prominently nerved; lower broad-lanceolate, acuminate, 3-nerved; upper corresponding in length and outline to the spikelet (as seen in back view), rather concave, rounded on the back, 5-nerved. Lower floret barren: valve similar to the upper glume, but glabrous and less concave, equalling it or very slightly shorter; valvule more or less reduced, keels scaberulous. Upper floret & lanceolateoblong, acute, $\frac{3}{4}$ lin. long, whitish, smooth.

Upper Guinea. French Guinea: Fouta Jallon; Dalaha plateau, 3250-4250 ft., Chevalier, 18755!

79. P. Hochstetteri, Steud. Syn. Pl. Glum. i. 90. Perennial, loosely cæspitose from a slender rhizome, from $\frac{1}{2}$ to over 1 ft. long. Culms very slender to filiform, erect from a much-branched base, above it simple or sparingly branched, many-noded, terete, glabrous, smooth, lower nodes enclosed, upper shortly, uppermost longexserted. Leaf-sheaths tight, terete, finely striate, ciliolate, otherwise glabrous or sparingly pubescent upwards, the basal very short, the uppermost up to $2\frac{1}{2}$ in. long; ligule reduced to a ciliolate rim: blades reflexed, often strongly so, linear from a slightly rounded base, tapering to a very slender somewhat blunt point, up to 3 in. by 2 lin., those of the basal shoots often much smaller, green, flat, more or less involute, particularly upwards, glabrous and smooth below or both sides loosely and shortly hairy, margins scaberulous, midrib and primary lateral nerves 2-3 on each side, very fine but distinct below only. Panicles long-exserted, widely open and loose, 2-3 in. by 2 to over 3 in., divided up to the third or fourth degree; common axis filiform, like all its divisions terete, glabrous and smooth or almost so, and more or less flexuous or wavy upwards, often purplish, lower internodes up to 6-8 lin. long, mostly much shorter or the lowest





almost suppressed (hence lowest branches subopposite), the following about 4-3 lin. long; branches solitary, loosely divided from some distance (up to 8 lin.) above the base, the longest two-thirds to threequarters the length of the panicle; lowest secondary branchlets rarely over 6 lin. long, often much shorter, like the others bearing few scattered or more or less approximate spikelets; pedicels $\frac{1}{2}$ -2 lin. long, tips minutely subdiscoid. Spikelets ovate-oblong to oblong in outline, acute, slightly over 1 lin. long, variegated or deep purple, glabrous. Glumes similar, lanceolate in profile, acute, thinly membranous, finely but very prominently nerved; lower narrower, four-fifths the length of the spikelet, finely 3-nerved; upper as long as the spikelet, boldly 7-nerved. Lower floret 3: valve very similar to the upper glume but somewhat shorter and often less acute; valvule slightly shorter, oblong, acute; anthers \(\frac{3}{4}\) lin. long. Upper floret &, oblong, acute or subacute, almost as long as the lower, yellowish or whitish, polished; valve and valvule thinly coriaceous.— Engl. Hochgebirgsfl. Trop. Afr. 119; Durand & Schinz, Consp. Fl. Afr. v. 751; Schweinf. in Bull. Herb. Boiss. ii. App. ii. 95; Chiov. in Ann. Istit. Bot. Roma, viii. 308, incl. vars. trichanthum and glaberrimum. P. trichanthum, A. Rich. Tent. Fl. Abyss. ii. 375; not of Nees. P. Richardii, Aschers. ex Schweinf. Beitr. Fl. Aethiop. 301. Isachne refracta, Hook. f. in Journ. Linn. Soc., Bot., vii. 227.

Upper Guinea. Cameroons: Cameroon Peak, 7000 ft., Mann, 1343! 2082! Nile Land. Eritrea: Amasen; Asmara plateau, Tellini, 350; Ambelaco near Maldi, 6550 ft., Schweinfurth, 17. Ocule Cusai; Assare scrub near Halai, 8500 ft., Pappi, 1956. Soyra Mountains, 9200-9850 ft., Pappi, 1157; Mount Metateu, 8200 ft., Pappi, 1595. Sarae; Gaza Gobo, 5900-6550 ft., Pappi, 129. Abyssinia: Tigre; Mount Hedja, 8500 ft., Schimper! Mount Sholoda, Schimper, 115! Amba Sea, 6000-7500 ft., Schimper, 1087! Agow Distr.; Bellaka, 6000-7000 ft., Schimper, 407! and without precise locality, Schimper, 127! Roth! Uganda: forest edge near Kipayo, 4000 ft., Dummer, 2411! Mt. Elgon; common in the bamboo zone, 9000-10,000 ft., Dummer, 3567!

80. P. pusillum, Hook. f. in Journ. Linn. Soc., Bot., vii. 227. Annual, growing in loosely tufted clumps, 3-6 in. high. Culms geniculately ascending, filiform, very weak, branched from most nodes with the lower branches interlacing and the upper short, but all ultimately flowering, terete or subangular, prominently striate, smooth and glabrous, nodes mostly exserted. Leaf-sheaths somewhat loose, subherbaceous, finely striate, softly hairy; ligule reduced to a fine ciliate membranous rim; blades lanceolate to lanceolate-linear from a gradually rounded and constricted base, acute, $\frac{1}{4}$ to over 1 in. by less than 1 to $3\frac{1}{2}$ lin., flat, thin and soft, spreading more or less horizontally, loosely and softly hairy all over, midrib and primary lateral nerves (2 or 1 on each side) very fine or hardly differentiated, cross-veins none. Panicles exserted, or at least the lateral enclosed with their base in the supporting sheath, erect, broad-ovate in outline, from less than \frac{1}{2} to over 1 in. long and wide, rigidly open and loose, divided up to the third or fourth degree;

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common axis filiform, terete, glabrous, internodes 4–2 lin. long; primary branches like their divisions much spreading, to horizontal or deflexed, capillary; the ultimate divisions bearing 2 scattered spikelets; pedicels $\frac{1}{2}$ – $1\frac{1}{2}$ lin. long, with truncate tips. Spikelets lanceolate to oblong, acute to acuminate, 1 lin. long, green, glabrous or loosely pubescent. Glumes thinly membranous, finely and prominently striate; lower lanceolate, acuminate, three-quarters to four-fifths the length of the spikelet, 3-nerved; upper corresponding in length and outline to the spikelet, 7-nerved. Lower floret barren; valve similar to the upper glume, but 5-nerved and sometimes slightly shorter; valvule more or less (sometimes much) reduced, linear, subobtuse, quite hyaline. Upper floret $\mbox{$\sepsimes$}$, oblong, obtuse, $\mbox{$\frac{3}{4}$}$ lin. long, whitish, polished: valve and valvule papery to subcoriaceous. —Durand & Schinz, Consp. Fl. Afr. v. 760. *P. tylanthum*, Hack. in Engl. Hochgebirgsfl. Trop. Afr. 118; Durand & Schinz, l.c. 766.

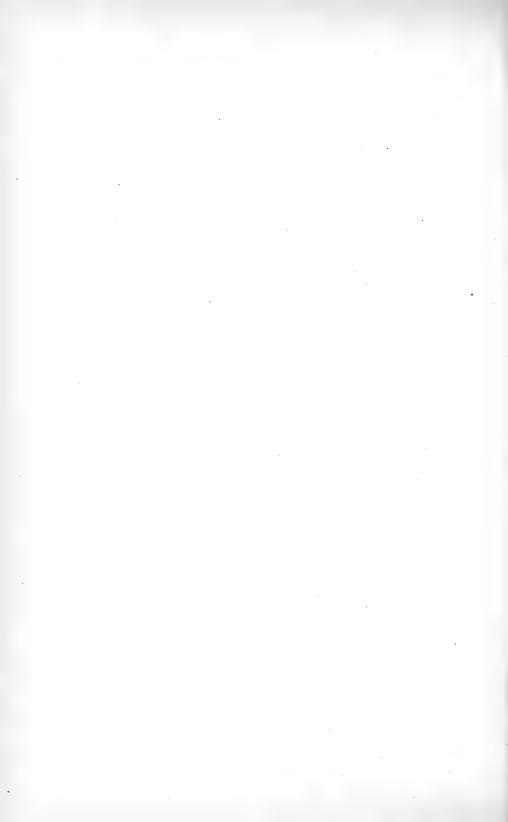
Upper Guinea. Cameroons: Cameroon Peak, 7000-8000 ft., Mann, 2090! Nile Land. Abyssinia: Tigre; Mount Hedja, 9000 ft., Schimper, 1095!

81. P. parvifolium, Lam. Ill. i. 173 (?), and Encycl. iv. 742. loosely tufted perennial, with long trailing and rooting stolons from a very slender rhizome, the flowering culms rising \frac{1}{2}-1 ft. above the leafy tufts. Culms filiform, many-noded, ascending, simple or sparingly branched, terete, smooth and glabrous, nodes mostly long-exserted. Leaf-sheaths tight, terete, finely striate, quite glabrous and smooth, usually much shorter than the internodes; ligule reduced to a fine ciliate membranous rim; blades lanceolate to linear-oblong from a rounded clasping base, acute, from less than $\frac{1}{2}$ to over $\frac{3}{4}$ in. by $1\frac{1}{4}$ $2\frac{1}{2}$ lin., flat, firm, spreading or more or less deflexed, quite glabrous, smooth, midrib and primary lateral nerves (2 to 3 on each side) very fine and sometimes indistinct with 3-4 secondary nerves in the intervals, connected by cross-veins. Panicles very shortly exserted, erect, ovate in outline, from $\frac{1}{2}$ to over 1 (rarely up to 3) in. long and broad, rigidly open and loose, divided up to the third degree; common axis angular, smooth; internodes irregularly short and long, in average panicles from 1-4 lin. long; primary branches like their divisions much spreading, to horizontal or deflexed, and bearing from some distance above the base 4-2 solitary spikelets or downwards 3-2-spiculate branchlets, finely filiform or like the pedicels capillary and smooth, the latter 1-2 lin. long, rarely longer, with truncate tips. Spikelets elliptic-oblong, subacute, $\frac{2}{3}$ to almost $\frac{3}{4}$ lin. long, somewhat plump, quite smooth. Glumes thinly membranous, finely but distinctly nerved, unequal; lower ovate, acute, about half the length of the spikelet, 3-nerved; upper corresponding to spikelet in length and outline, 5-nerved. Lower floret barren: valve like upper glume; valvule oblong, shorter. Upper floret \(\begin{align*} \), broadly ovate-elliptic in outline, subapiculate, whitish, $\frac{1}{2} - \frac{5}{8}$ lin. long, polished; valve and valvule subcoriaceous;

Suche

P. monden 1916. Men. well. 1926, 10.132. Kilinanjuro, a. 5. 14. 2862

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anthers $\frac{1}{4}$ lin. long. Grain rotundate-elliptic in outline, almost $\frac{1}{2}$ lin. long.—Roem. & Schult. Syst. ii. 445; Nees, Agrost. Bras. 224; Trin. Sp. Gram. Ic. et Descr. t. 236, Pan. Gen. 224, 225, and in Mém. Acad. Sc. St. Pétersb. 6me sér. iii. 312, 313; Steud. Syn. Pl. Glum. i. 88; Kunth, Enum. i. 109; Durand & Schinz, Consp. Fl. Afr. v. 758; Cheval. Sudania, 65. *P. brasiliense*, Spreng. Syst, i. 321. *P. raripilum*, Kunth, Rév. Gram. ii. t. 114, and Enum. i. 109; Steud. Syn. Pl. Glum. i. 91; Durand & Schinz, Consp. Fl. Afr. v. 760.

Upper Guinea. Senegambia: in fields near Albida, Leprieur! Sierra Leone: Mayoso, 350 ft., Thomas, 1503! Magbile, Thomas, 6277! Southern Nigeria: Lagos; Ikoyi Plains, at the edge of pools, Dalziel, 1319! Opobo, Jeffreys, 17! Lagos Island, in swampy places, Barter, 20221! Aguku Distr., Thomas, 733! Lower Guinea. French Gaboon: Cape Lopez, Chevalier, 4319! Belgian Congo: Stanley Pool Distr.; Kimuenza, Gillet, 1784! between Dembo and Kisantu, Gillet, 1600! Leopoldville, Gillet, 2650! Kwango Distr.; Mukulu, Vanderyst, 3352! 3354! Aténé, Vanderyst, 3427!
Also in Madagascar and in tropical South America.

82. P. Beccabunga, Rendle in Cat. Afr. Pl. Welw. ii. 179. A straggling perennial with long-trailing culms, rooting at the nodes, the very slender rhizome dying off behind. Culms filiform, manynoded, the internodes hardly over 9 lin. long, terete, smooth, glabrous, long-exserted. Leaf-sheaths tight, up to 4 lin. long, finely striate, quite glabrous and smooth; ligule reduced to a narrow membranous rim; blades narrowly ovate to lanceolate from a rounded clasping base, acute or acutely acuminate, 4-9 lin. by 2-3 lin., flat, firm, obliquely spreading, quite glabrous, smooth, midrib and primary lateral nerves (2-3 on each side) very fine with 3-4 indistinct secondary nerves in the intervals, connected by cross-veins. Panicles very shortly exserted, erect, ovate in outline, from 6-9 lin. long and 4-5 lin. wide, rigidly and moderately open, divided to the second, rarely the third degree; common axis slightly angular, quite smooth, internodes irregularly short and long, 1-2 lin. long; primary branches spreading at 45°-60°, bearing from near the base about 6 solitary spikelets; branches and pedicels fine, terete, smooth and glabrous, the pedicels from less than \(\frac{1}{2}\)-1 lin. long. Spikelets elliptic-oblong, obtuse, almost 1 lin. long, somewhat plump, quite smooth. Glumes thinly membranous, finely but distinctly nerved, unequal; lower broad-ovate, subacute, over half to two-thirds the length of the spikelet, 3-nerved; upper corresponding to the spikelet in length and outline, 5-nerved. Lower floret of (?): valve like the upper glume; valvule slightly shorter, oblong, with minutely scaberulous keels. Upper floret \(\), broadly elliptic-oblong in outline, obtuse, \(\frac{3}{4}\) lin. long, polished, white; valve and valvule subcoriaceous.

Lower Guinea. Angola: Huilla; by cold streams in the mountains of Morro do Monino, Welwitsch, 2694!

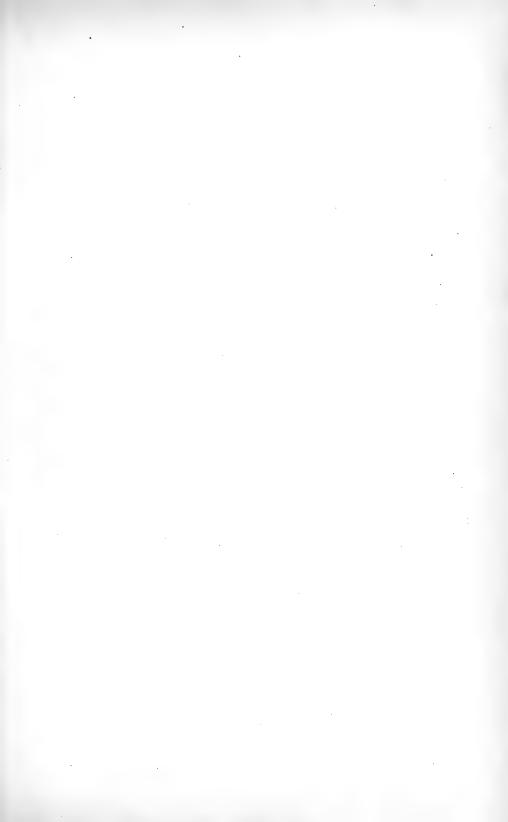
83. P. caudiglume, Stapf. Annual, up to over 1 ft. high, growing gregariously in patches. Culms filiform, weak, erect or subcrect,

rooting from the lower nodes, simple or sparingly branched, terete, whitish, sparsely and very finely hairy, internodes mostly longexserted and the intermediate $1-1\frac{1}{4}$ in. long. Leaf-sheaths thin, tight or at length involute and slipping off the stem, finely and loosely hairy, finely striate; ligules very short, membranous, truncate, ciliolate; blades linear-lanceolate from a shortly attenuated and constricted base, finely acuminate, $1-2\frac{1}{2}$ in. by $1\frac{1}{2}-4$ lin. (the lower small), flat, very thin, flaccid, green, sparingly hairy on both sides with long extremely fine hairs, margins scaberulous, midrib very fine, whitish below, primary lateral nerves 1 on each side, very slightly differentiated from the other nerves. Panicles exserted, at least the terminal, flaccid and contracted, $1\frac{1}{2}-2\frac{1}{2}$ in. long, divided to the third degree; common rhachis filiform, terete, striate, like its principal divisions smooth or slightly rough upwards and beset with scattered long and very fine hairs, lower and intermediate internodes 3-4 lin. long, upper decreasing very gradually; lower primary branches flexuous, up to 1½ in. long, finely filiform to almost capillary, loosely branched from the base, the branchlets divided in the same way, the latter distant by 2-3 lin. and up to 6 lin. long or the lowest much longer, divisions of all grades fascicled at the lower nodes; pedicels capillary, 1-3 lin. long, tips very obscurely widened. Spikelets ovate-lanceolate, finely caudate, including the tail $\frac{3}{4} - \frac{7}{8}$ lin. long, pale greyish-green, very finely pubescent from the glumes and lower valve. Glumes very dissimilar; lower a minute roundish hyaline scale, one-fifth the length of the lower valve to which it is applied tightly; upper corresponding in length and outline to the spikelet, produced into a fine curved bristle-like tail $\frac{1}{2} - \frac{2}{3}$ lin. long, 5-nerved with the outer nerves very faint or almost suppressed. Lower floret barren: valve as long as the body of the upper glume, and very like it, 3-nerved, oblong, acuminate; valvule more or less reduced, oblong, acute, acuminate, keels very faint, scaberulous upwards. Upper floret $\normalfont{\del{Gamma}}$, oblong, obtuse, about $\normalfont{\del{Gamma}}$ lin. long, whitish, polished.

Mozambique Distr. Nyasaland: Shire Highlands; Namasi, Cameron, 16!

This may be identical with P. delicatulum, Fig. & De Not. (in Mem. Ac. Torin. ser. 2, xii. 351, t. 20, fig. 1–13; Durand & Schinz, Consp. v. 746), collected by Figari on the Blue Nile; but I have not seen specimens of Figari's plant and on comparison of the description and figures of P. delicatulum with Cameron's, I find the former to differ in the following points: more copious and subdichotomous branching, larger leaf-blades ($3\frac{1}{3}$ in. by 6 lin.) with a glabrous upper face, larger spikelets with a comparatively shorter tail (body $1\frac{1}{2}$ lin., tail $\frac{1}{2}$ lin.) and larger false fruits (1 lin.). The dimensions of the spikelet given here are based on the authors' figs. 1 and 2, which are said to be magnified 10 times. The magnification of figs. 3–12 is given as 20, which, however, does not answer to the values deducible from figs. 1 and 2.

84. P. tephrosanthum, Hack. in Bull. Herb. Boiss. 2me sér. i. 766. Perennial (?), up to over 2 ft. high. Culms erect, slender, terete, glabrous, internodes shortly exserted. Leaf-sheaths (upper only seen) tight, terete, smooth, glabrous except near the mouth and



84+ P. Figarianum Chiov.

84 + + P. Humbertin Robens Humbert 8759 type Congr

Robogns reduces 85 to P. mulense Vander Schwanttens mulensis Vander

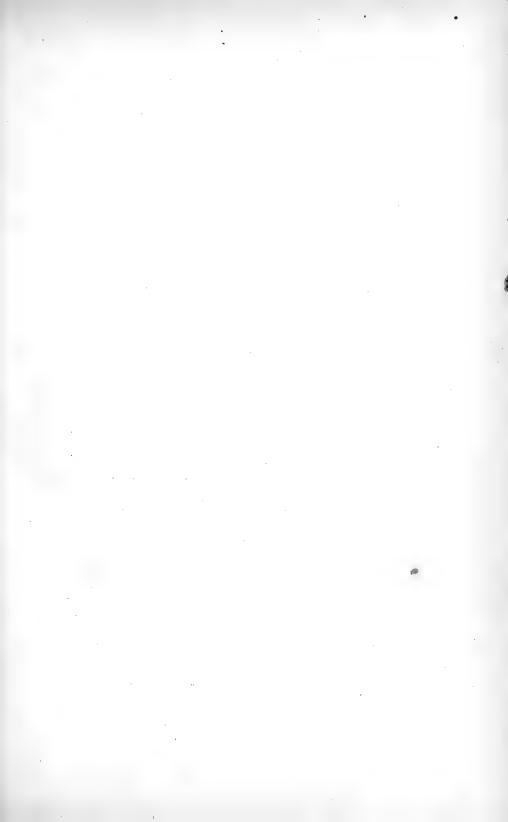
along the more or less tomentose junction with the blade and the long-bearded nodes; ligules short, membranous, ciliate; blades linear-lanceolate, gradually tapering to an acute point, 7 in. by 3 in., flat, somewhat soft, loosely and softly and sometimes very sparingly hairy, particularly below, hairs very fine from minute tubercles, margins cartilaginous, rigidly ciliolate, primary nerves about 5 on each side. Panicles ovate in outline from an acuminate base, about 10 in. by 4 in.; common axis subangular, smooth below, upwards scaberulous; lowest branches pseudo-verticillate, 4-nate, the following scattered or 3-2-nate, up to 5 in. long, obliquely erect, undivided for $1-\frac{1}{2}$ in., then bearing scattered lax racemes up to over $1\frac{1}{2}$ in. long, filiform, flexuous, scaberulous; pedicels subcapillary, unequal, the longest up to 6 lin, long, with fine white hairs below the slightly thickened tips. Spikelets elliptic to ovate-oblong in outline, acute to subobtuse, $1\frac{1}{2}-1\frac{3}{4}$ lin. long, very pale, tomentose all over. very thin, densely covered with soft hairs; lower rotundate-ovate, obtuse, hyaline, one-third to half the length of the spikelet, faintly 1-nerved; upper corresponding to the spikelet in length and outline, finely 5-nerved. Lower floret barren (or 3?): valve very similar to the upper glume; valvule oblong, subacute, shorter than the valve, with a few hairlets from the keels. Upper floret \(\), oblong, subacute, minutely hairy from the tip, 1 lin. long, straw-coloured: valve and valvule papery, faintly transversely rugose, the valve faintly 5-nerved; anthers $\frac{3}{4}$ lin. long.

Mozambique Distr. Portuguese East Africa: Boruma, Menyharth, 898!

85. P. microthyrsum, Stapf. Perennial (?), up to 2 ft. high from a long prostrate base. Culms long-ascending, many-noded, freely rooting from the nodes of the prostrate base, much branched below, with the branches barren or flowering, terete, finely pubescent, internodes exserted, mostly about 1 in. or the uppermost up to 3 in. long. Leaf-sheaths subherbaceous, finely and loosely hairy to hirsute (upper sheaths of barren shoots), finely striate, the lower loose and very short, and those of the base early decaying, the upper longer, tight and terete; ligules very short, membranous, truncate, ciliate; blades linear-lanceolate from a rounded and much constricted base, tapering to an acute point, $1\frac{1}{4}$ to almost 2 in. by 2-3 lin., obliquely erect, flat, thin, finely and loosely hairy to subglabrescent, midrib and primary lateral nerves (about 3 on each side) very fine, distinct only below, cross-veins none. Panicles exserted, erect and at length rather rigid, 2 to over 3 lin. long, contracted or some of the longer branches more or less spreading, divided to the fourth degree; common rhachis subfiliform, terete or angular, like its principal divisions more or less finely and loosely hairy, but smooth, lower internodes 1-1 in. long with a short one thrown in here and there, the upper rapidly decreasing in length; lower primary branches up to over 1 in. long, finely filiform, at length like all the others very rigid, all branched from the base; secondary branchlets mostly $1\frac{1}{2}$ —2 lin. distant, up to 6 lin. long, but mostly much shorter, again divided from the base; pedicels capillary, very unequal, from very short to over 2 lin. long, with obscurely widened tips. Spikelets lanceolate, acuminate, 1 lin. long, pale greyish-green, very finely pubescent from the glumes and the lower valve. Glumes very thinly membranous, very finely nerved; lower ovate, acute or subacuminate, up to half the length of the spikelet, 1-nerved, almost hyaline; upper corresponding to the spikelet in length and outline, 3–5-nerved. Lower floret reduced to the valve which is very similar to the upper glume but 3-nerved. Upper floret $\[\] \]$, lanceolate-oblong, acute, $\[\] \]$ lin. long, turning brown, polished.

Lower Guinea. Belgian Congo: Stanley Pool District; Kimanzu, Gillet, 1720!

86. P. trichoides, Sw. Prodr. Veg. Ind. Occ. 24. Annual, loosely tufted, from a few inches to 1½ ft, high. Culms very slender to filiform from an ascending base, up to 9- or more-noded, terete, glabrous or more or less finely pubescent, lower internodes short, those of the upright part few and long (the uppermost up to over 6 in.) and longexserted. Leaf-sheaths thin, the lower loose and short (3-4 lin. long), the upper tight and long, prominently striate, spreadingly hirsute with tubercle-based hairs; ligule a very narrow membranous ciliolate rim; blades narrowly lanceolate, from a rounded much constricted base, finely acuminate, from less than 1 (lower leaves) to 3 in. by 3-4 lin., flat, very thin, flaccid, sparingly and finely hairy, margins scaberulous, midrib and primary nerves (about 3 on each side) very fine, secondary nerves about 5 in each interval with obscure extremely delicate cross-veins. Panicles erect, longexserted, ultimately somewhat stiff, widely open and very loose and delicate, ovate-oblong in outline, up to 9 in. by 6-8 in., divided to the third degree; axis very slender, terete or angular, smooth below, scaberulous upwards, internodes $\frac{1}{3} - \frac{2}{3}$ in. long, sometimes with a few longer ones thrown in; primary branches finely filiform, ultimately much spreading, smooth like all the following divisions, and like these very loosely divided from the base, the longest up to 4 in. long; secondary branchlets finely capillary, up to 8 lin. long, bearing 3-1 very widely scattered spikelets; pedicels extremely delicate, but straight, 3-8 lin. long, not thickened upwards. Spikelets ellipticoblong, obtuse, very slightly over \frac{1}{2} lin. long, hardly oblique in profile, greenish, finely puberulous. Glumes very thinly herbaceous, very faintly nerved; lower broad-ovate from a clasping base, acute, 3- to sub-5-nerved, upper corresponding to the spikelet in length and outline, 5-nerved, broad on the back. Lower floret barren; valve very like the upper glume; valvule reduced to a hyaline oblong scale. Upper floret &, elliptic in outline, acute, less than ½ lin. long, whitish or yellowish, smooth, but not polished; valve and valvule papery.—Sw. Fl. Ind. Occ. i. 176 (partly); H. B. & K. Nov. Gen. i. 105; Presl, Reliq. Haenk. i. 309; Kunth, Enum. i. 112; Klatt in



sop J 86. Isachre mayowensis Vander

Jahrb. Hamb. Wiss. Anstalt. ix. 120; Rendle in Cat. Afr. Pl. Welw. ii. 183; Hitchcock in Contrib. U.S. Nat. Herb. xii. 140; xv. 129, 131; xvii. 249, 504. *P. capillaceum*, Lam. Encycl. i. 173; Doell in Mart. Fl. Bras. ii. ii. 249, incl. var. strictius. *P. filamentosum*, Pers. Syn. i. 83.

Upper Guinea. Gold Coast: Ashanti; Mansu, Cummins, 11! Southern Nigeria: New Calabar; Degema, Holland, 135! Eruwa (collector?), 60! and without precise locality, Thomas, 1760!

Lower Guinea. Angola: Golungo Alto?, Welwitsch, 2962!

Widely distributed throughout tropical America and often a weed of cultivation. Probably introduced in Africa. Klatt (l.c.) quotes it from Zanzibar (Stuhlmann).

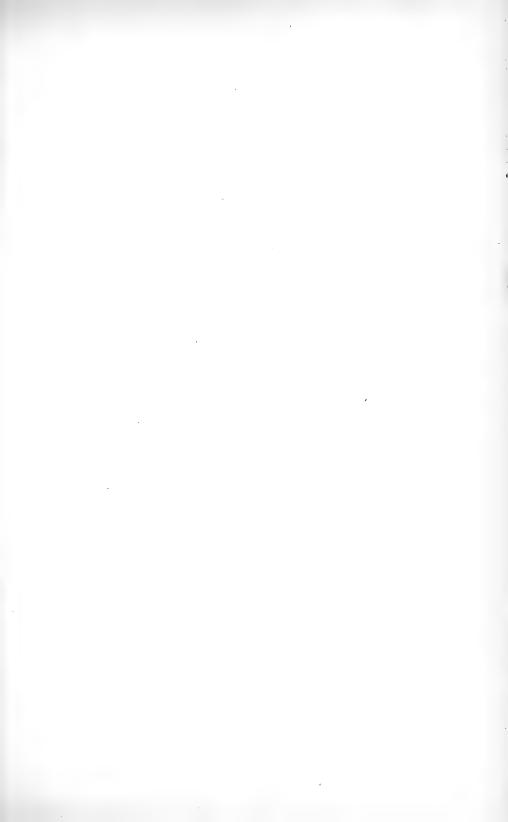
87. P. brevifolium, Linn. Sp. Pl. ed. i. 59. Annual, very loosely tufted on an often prostrate base or rambling among other vegetation, 2 or more ft. (up to 7) high. Culms slender, weak, very many-noded, throwing out aerial roots from the lower nodes (usually one per node), branched from the prostrate or ascending base, simple or almost so upwards, terete, smooth and glabrous, internodes exserted or the lowest becoming quite bare by the loss of their sheaths. Leafsheaths tight or the lower loose and thrust aside, prominently finely striate, densely long-ciliate, otherwise glabrous and smooth, rarely with a few hairs here and there: ligule a low membranous rim; blades lanceolate to lanceolate-ovate from a broad rounded to subcordate and tightly constricted to subpetiolate base, 1-3 in. by 6-10 lin., spreading, flat, very thin, green, usually long-ciliate at the rounded base, otherwise loosely and appressedly hairy to glabrous, midrib very fine, whitish below, primary lateral nerves 3-4 on each side, distant, with about 5 secondary nerves between, connected by extremely delicate and often inconspicuous cross-veins. Panicles erect, at length long-exserted, delicate, widely open and very loose, broad-oblong, ovate or obovate in outline, from less than 3 to over 6 in. by 2-6 in., divided to the third or fourth degree; common axis like all its divisions, terete, glabrous and smooth or scaberulous upwards, very slender, lower internodes mostly about 1 lin. long, but here and there one much shorter to almost suppressed, or up to almost 2 in. long; primary branches solitary or 2-nate or subopposite, obliquely spreading, wavy, but more or less rigid, very loosely divided from the base or near it and then often forming imperfect false whorls or from some distance above it, filiform, very fine upwards, internodes mostly 7-4 lin. long; secondary branchlets capillary, up to over 1 in. long, bearing 4-1 very loosely scattered spikelets; pedicels very unequal, 1-6 lin. long, tips very slightly thickened. Spikelets ovate-oblong to oblong, acute (back view), oblique in profile, \(\frac{3}{4}\) lin. long, green, glabrous or rarely pubescent, the lower floret with the lower glume persistent for some time after the fall of the fruit and upper glume. Glumes equally long but very different in shape and texture; lower hyaline to subhyaline, linear-lanceolate, acute, finely 3- or sub-3-1-nerved, rather flat; upper herbaceous-membranous, green, corresponding in length and outline to the spikelet, very concave with a broad back, 5-nerved. Lower floret of or barren: valve similar to the upper glume but thinly membranous and much less concave or almost flat on the back; valvule almost as long, lanceolateoblong, acute, rather firm, keels rough; anthers if any 2 lin. long. Upper floret \(\frac{\pi}{2}\), broad-elliptic, obtuse, up to \(\frac{2}{3}\) lin. long, whitish, smooth: valve and valvule papery, the latter with very broad flaps; anthers as in the of floret. Grain broad-ovate-elliptic in outline, not quite ½ lin. long, yellowish, hilum punctiform. Embryo half the length of the grain.—Roxb. Fl. Ind. ed. Carey, i. 308; Hitchcock in Contrib. U.S. Nat. Herb. xii. 140; Cheval. Sudania, 101. P. arborescens, Linn. Sp. Pl. ed. i. 59 (partly); Rendle in Cat. Afr. Pl. Welw. ii. 176; Stapf in Johnston, Liberia ii. 667; Th. & Hél. Durand, Syll. Fl. Congol. 630. P. biflorum, Lam. Ill. i. 174, and Encycl. iv. 743. P. dubium, Lam. Encycl. iv. 743; Doellin Mart. Fl. Bras. ii. ii. 270. P. ovalifolium, Poir. Encycl. Suppl. iv. 279; P. Beauv. Fl. Owar. ii. 79, t. 110, fig. 1; Kunth, Enum. i. 113; Nees, Fl. Afr. Austr. 44 (in note); Hook. Niger Fl. 561; Steud. Syn. Pl. Glum. i. 84; Benth. Fl. Hongk. 413; Duthie, List Grass, N.-W. Ind. 6; Hack, in Bolet. Soc. Brot. v. 210; Durand & Schinz, Consp. Fl. Afr. v. 758, and Études Fl. Congo, 323; Franch. Contr. Fl. Congo Franç. in Bull. Soc. Hist. Nat. Autun, viii. 341 (33 of reprint); Hook. f. Fl. Brit. Ind. vii. 44, and in Trim. Handb. Fl. Ceyl. v. 149; Cummins in Kew Bulletin, 1898, 81; De Wild. & Durand, Contr. Fl. Congo, fasc. ii. 73; Reliq. Dewevr. 256, and in Bull. Herb. Boiss. 2me sér. i. 61; Pilger in Schlechter, West-Afr. Kautschuk-Exped. 268; De Wild. Miss. É. Laurent, 201. P. amplexicaule, Poir. ex P. Beauv. l.c. 80. P. quineense, Desv. MS. ex Poir. Encycl. Suppl. iv. 279. P. tricarinatum, Steud. Nomencl. ed. 2, ii. 264, and Syn. Pl. Glum. i. 94. P. trichopiptum, Steud. l.c. 85. P. litigosum, Steud. l.c. 89. P. gladiatum, Wawra in Maximil. Reise, 178, t. 31. Isachne tricarinata, Roth, Nov. Spec. 57; Kunth, Enum. i. 136.

Upper Guinea. Sierra Leone: Bafodeya, Scott Ellict, 5628! Matotoka 400 ft., Thomas, 1234! Binkolo, 570 ft., Thomas, 1774! Bumban, 650 ft., Thomas, 1989! Kanya, 1000 ft., Thomas, 2930! Bumbana, 650 ft., Thomas, 3296! 3397! Yombana, Thomas, 4257! 4684 a! Mamaha, Thomas, 4404! Port Lokoh, Thomas, 6514! Bo, Thomas, 7446! and without precise locality, Afzelius! Strickland! Thomas, 5458! French Guinea: Timbo, Pobeguin, 1722! Liberia: within 20 miles of Kakatown, Whyte! Gold Coast: Ashanti; Asim Yan Kumassi, Cummins, 167! Aburi, Johnson, 1008! Southern Nigeria: Lagos; interior, Rowland! Lagos Island, Dalziel, 1121! Dawodu, 382! Millen, 119! Akassa on the Nun river, Barter, 2090! Onitsha, in shady woods, Barter, 1780! Opobo, Jeffreys! Oban, Talbot, 770! Old Calabar, Robb! Cameroons: Victoria, Winkler, 54! Lolodorf, Standy, 201!344! very common in cassava fields and open bush near Batanga, Bates, 55! 55 a! Fernando Po, Vogel, 85! Mann, 116! Prince's Island, Mann, 2020! Rattray! Newton!

North Central. East Shari: Senoussi country; Kaga M'Bra, Chevalier, 6595!

Nile Land. Uganda: Entebbe, in gardens, 3900 ft., Mahon!
Lower Guinea. St. Thomas Island: Roca Ledroma, Mocquerys, 135! Nora Moka, 2700 ft., Moller, 136! Rolas Island, Quintas! Gaboon: Sierra Corisco, Strickland! and without precise locality, Griffon du Bellay! Loango: swamps 1722! Liberia: within 20 miles of Kakatown, Whyte! Gold Coast: Ashanti;

Strickland! and without precise locality, Griffon du Bellay! Loango; swamps



88- P. mariae Stend. Bowin 1620!

sphels become bristly at maturity as in P. hirtury

hithun ;

near Chinchoxo, Soyaux, 146! Jardin! Landana, Phillips! French Congo: Brazzaville, Brazza & Thollon, 379! N'Goma valley, Lecomte! Belgian Congo: Lower Congo, Smith! Cabra! Boma Distr.; Shinganga, Dewévre, 319. Cataracts Distr.; Tombe (Lutété), Hens, A. 270! Kitobola, Laurent; between Tombe and Kitobola, in shady places, Vanderyst, 4426! Stanley Pool Distr.; Dolo, Schlechter, 12496! M'suata, Büttner, 557. Kisantu, Gillet, 254, 726. Kunzulu, Vanderyst, 5191! Equator Distr.; Eala (collector?); Kassi, Distr. Lude! Aprola.; Golungo, Alto: in very shady woods by the Kasai Distr., Luja! Angola: Golungo Alto; in very shady woods by the Cuango river, Welwitsch, 2982! Queta Mountains and along the Delamboa river, Welwitsch, 7223! Banza do Bongo; Aquitamba, Welwitsch, 7299! and without precise locality, Welwitsch, 2968!

Mozambique Distr. Zanzibar, Boivin!

Also throughout tropical Asia.

88. P. heterostachyum, Hack. in Oest. Bot. Zeitschr. 1901, 430. Annual, 1-11 ft. high. Culms subfiliform, erect or more often geniculately ascending, simple or branched (sometimes subdichotomously) above the base, 4-5-noded, terete, smooth, glabrous, the lower bared by the thrusting aside or falling off of the sheaths, Leaf-sheaths at first tight, but soon loosened, except the upper, thinly subherbaceous, finely prominently striate, loosely ciliate. otherwise glabrous or softly and loosely pubescent; ligule an obscure hyaline almost sparsely ciliate rim; blades lanceolate-ovate from a broadly rounded or cordate and tightly constricted base, acutely acuminate, 1 in. by 4 lin., spreading or flaccid, flat, thin, green, long-ciliate at the rounded base, shortly ciliate upwards, almost glabrous, margins scaberulous upwards, midrib very fine, all the lateral nerves alike, rarely some primary nerves (3-4 on each side) differentiated, cross-veins very inconspicuous. exserted (at least the terminal), ovate-rotundate in outline, rigidly open and very loose, $1\frac{1}{2}$ -3 in. and almost as wide, divaricately divided up to the third degree; axis filiform, terete, beset with fine usually tubercle-based spreading hairs, otherwise like all its divisions smooth or almost so and slightly viscous, internodes 2-3 lin. long, here and there with a shorter one thrown in; primary branches subhorizontally spreading, loosely divided from $1\frac{1}{2}-2$ lin. above the base, subcapillary; secondary branchlets capillary, the lower bearing up to 3 widely scattered spikelets; pedicels 1-1\frac{1}{2} lin. long, with obscurely thickened tips. Spikelets gibbously ovate in profile when young, less so when mature and then with a broadly rounded back, 1 lin. long, bright green. Glumes thinly membranous, glabrous or loosely and very shortly or very long hairy all over, equally long, the lower much thinner, concave at first, then almost flat, lanceolate, acute, 3-nerved; upper broad-oblong and shortly acuminate in outline, very concave, gibbous below, 5-nerved. Lower floret barren: valve oblong, acute, as long as the glumes, but less concave and not gibbous, 5-nerved, hairs submarginal only, or none; valvule oblong, acute, slightly shorter than the valve, keels scaberulous. Upper floret broad-oblong, subacute, very convex on the rounded back, slightly over \frac{1}{2} lin, long: valve and valvule papery, pale, slightly rough from very minute thin-walled papillæ which are appressed and directed forward; anthers $\frac{1}{2}$ lin. long.—Eyles in Trans. R. Soc. S. Afr. v. 300.

Nile Land. Eritrea: Keren; Boga Valley, Steudner, 1009! British East Africa: Kibwezi, Kässner, 710!

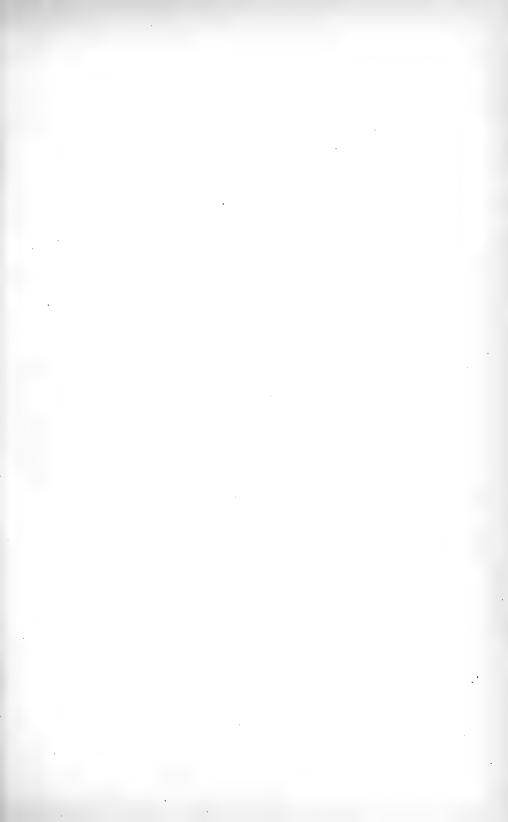
Mozambique Distr. Northern Rhodesia: near Mumbwa (15° S. 28° E.), Mrs. Macaulay, 75! Livingstone, in sand, 3000 ft., Rogers, 7034!

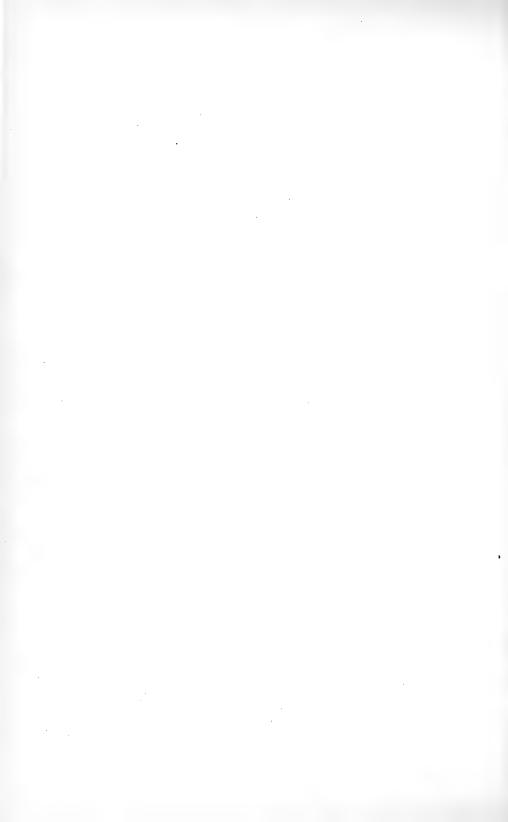
Imperfectly known species.

89. P. Bossii, Tropea in Boll. Ort. Bot. Giord. Col. Palermo, x. 100. Annual. Culms erect, simple or branched upwards with brown slightly thickened nodes. Leaf-sheaths sparingly tubercled; blades broad-linear, acuminate, flat, ciliate-denticulate at the base. Panicle erect, large, rather wide and loose; branches solitary, capillary, hardly horizontal (patentibus); pedicels stiff. Spikelets pale green, ovate, acute. Lower glume minute, obtuse; upper acute, obsoletely 5-nerved. Lower floret barren. Upper floret \u2203, ovate, subacute, smooth, yellowish: valve and valvule coriaceous.

Nile Land. Italian Somaliland: Benadir; near Giumbo, Macaluso. Said to be allied to P. coloratum, Linn., and P. repens, Linn. The description is too incomplete to suggest to me any definite affinity.

90. P. buluwayense, Hack. in Proc. Rhodesia Scient. Assoc. vii. part ii. (1908) 69, and in Fedde, Repert. vi. 323. Perennial, up to 11 ft. high. Culms compressed, simple, 3-4-noded, quite glabrous. Leaf-sheaths rather loose, the lower compressed and keeled, the upper terete, ciliate along the margins, hirsute with tubercle-based hairs, pubescent at the nodes; ligule reduced to a fringe of cilia; blades linear-lanceolate from a narrow base (the lower) or from a rotundate base (the upper), gradually tapering to a slender point, 6-8 in. by $7\frac{1}{2}$ lin., firm, green, glabrous, scabrid along the margin, midnerve stout, lateral nerves slender. Inflorescence of about 12 very much spreading sessile secund spiciform racemes; common axis about 4 in. long. Racemes irregularly 4-ranked, simple, the lower $2\frac{1}{4}$ in. long and solitary, $1-1\frac{1}{5}$ in. distant, the upper more approximate to subverticillate, over 1 in. long, shortly bearded at the base, rhachis half the width of the spikelets, loosely and finely pubescent, with some long hairs in the lower part, margins scabrid-ciliolate; pedicels paired, minutely puberulous, not thickened at the tips, one of each pair \frac{1}{4} lin., the other \frac{1}{2} lin. long. Spikelets subimbricate, ovatelanceolate, acuminate, turgid, green, variegated with dull purple, quite glabrous. Lower glume three-quarters to four-fifths the length of the spikelet, cuneate-lanceolate and narrower than it, acute, 3-nerved; upper ovate-lanceolate, acuminate, convex, as long as the lower floret, 3-nerved. Lower floret 3: valve similar to the upper glume but flat; anthers $\frac{3}{4}$ lin. long. Upper floret \heartsuit , ellipticrotundate, shortly mucronate, half the length of the spikelet; valve





and valvule transversely rugose, the former 3-nerved; anthers 1 lin. long.—Eyles in Trans. Roy. Soc. S. Afr. v. 299.

Mozambique Distr. Rhodesia: Bulawayo, Jeffreys, 28.

This was referred by the author to the § Brachiaria of Panicum. It is clearly a species of *Urochloa*, and evidently closely allied to *U. pullulans*, Stapf, which has, however, usually densely and spreadingly bearded nodes, blades with a slender midrib, erect or suberect, 2-ranked and more evenly disposed racemes, elliptic-oblong spikelets and a 5-nerved upper glume and lower valve.

91. P. catangense, Chiov. in Ann. di Bot. Roma, xiii. 44. Perennial, cæspitose, coated at the base with the remains of old sheaths and culms; innovations extravaginal. Culms terete, slender, appressedly pubescent with clavellate-tipped hairs intermixed. Leaf-sheaths loose, longer than or as long as the internodes, closely striate, indumentum like that of the culms with a dense dorsal transverse line of whitish hairs at the upper end; ligule a densely ciliate rim; blades linear-lanceolate, slightly constricted at the base, tapering upwards to an obtuse tip, $\frac{3}{4}-2\frac{1}{4}$ in. by 2-3 lin., the uppermost very short. Panicle ovate-pyramidal, loose; lowest branches more or less arrested, barren, intermediate fascicled, 2 or 3 of a fascicle fertile, the rest arrested, upper solitary, the fertile branches erect and appressed to the common axis or (the upper) spreading, undivided at the base, often with some arrested spikelets, all the divisions slender, very minutely scaberulous, flexuous, glabrous except for some clavate-tipped hairs; pedicels 13-3 lin. long or the terminal much longer, with some clavate-tipped hairs near the tips which are hardly thickened. Spikelets narrowly oval, subterete, subacute, $1\frac{2}{5}$ lin. by almost $\frac{1}{2}$ lin. Lower glume rotundate-truncate, entire, half the length of the spikelet, 5-nerved; upper oblong, two-thirds the length of the spikelet, truncate or rotundate or minutely and irregularly dentate, 7-nerved, nerves somewhat stout. Lower floret barren: valve elliptic, similar to the upper glume, 7-nerved; Upper floret &, narrowly ovate, with a slightly incurved tip, pale yellowish, dull, but quite smooth and glabrous; valve and valvule cartilaginous.

South Central. Belgian Congo: Katanga; Bianos plateau, Katantania, Bovone, 92.

Evidently nearly allied to P. pectinellum, Stapf, after which it should be inserted. It differs clearly, however, by the much larger entire first glume and the minutely dentate upper glume and lower valve.

- 92. P. Cienkowskii, Rupr. ex Aschers. in Schweinf. Beitr. Fl. Aethiop. 300; Durand & Schinz, Consp. Fl. Afr. v. 742 (name only). Nile Land. Cordofan, Cienkowski.
- 93. P. crinitum, Hack. ex Durand & Schinz, Consp. Fl. Afr. v. 744 (name only).

This, from the locality and number quoted, is Digitaria xanthotricha, Stapf (see p. 451 of this work).

Jan Shir washer Mi.

94. P. glabrescens, Steud. Syn. Pl. Glum. i. 71. Perennial, up to 2 ft. high, with a shortly creeping rhizome. Culms erect, subfistular, glabrous like the whole plant, internodes few. Leaf-sheaths with brown bases (nodes); ligule short, membranous, ciliate; blades linear-lanceolate, acuminate, 8–12 in. by 2 lin., with scaberulous margins. Panicles erect, rather loose, 6–8 in. long, with subverticillate virgate erect branches and pedicels longer than the spikelets. Spikelets oblong-lanceolate, acute, 1 lin. long, glabrous. Lower glume ovate from a clasping base, acute, less than half the length of the spikelet, 1-nerved; upper glume 5–7-nerved. Lower floret barren, equalling the upper glume and like it. Upper floret \(\frac{\pi}{\pi}\), polished.—Durand & Schinz, Consp. Fl. Afr. v. 750.

Upper Guinea. Senegal, Leprieur.

The author compares this with P. fistulosum, Hochst., a South American grass, closely allied to P. longijubatum, Stapf, and it may indeed prove identical with the latter. I have not found the original of the species in Steudel's herbarium at Paris.

95. P. gracillimum, K. Schum. in Engl. Jahrb. xxiv. 331. Culms simple, $2-2\frac{1}{3}$ ft. high, slender, terete, quite glabrous. Leaf-sheaths 3-5 in. long, quite glabrous; ligule very short, densely and shortly ciliate; blades linear, up to 1 ft. by 3 lin., glabrous and smooth. Panicle rather large, subovate in outline, up to $\frac{1}{2}$ ft. long, very delicate; branches and pedicels capillary, subflexuous, quite glabrous, flushed with pale purple upwards, tips thickened. Spikelets 1 lin. long. Glumes equal, as long as the spikelet, membranous; lower ovate, subacute, flat, 1 lin. long, yellowish-green, glabrous; upper subobtuse, ciliolate. Lower floret \circlearrowleft , like the upper glume. Upper floret $\mbox{$\swarrow$}$, ovate-lanceolate, acuminate, $\frac{4}{5}$ lin. long, polished: valve and valvule thinly membranous.

Lower Guinea. Angola: near Dondo, Mechow, 25. Probably a member of the § Verruculosæ.

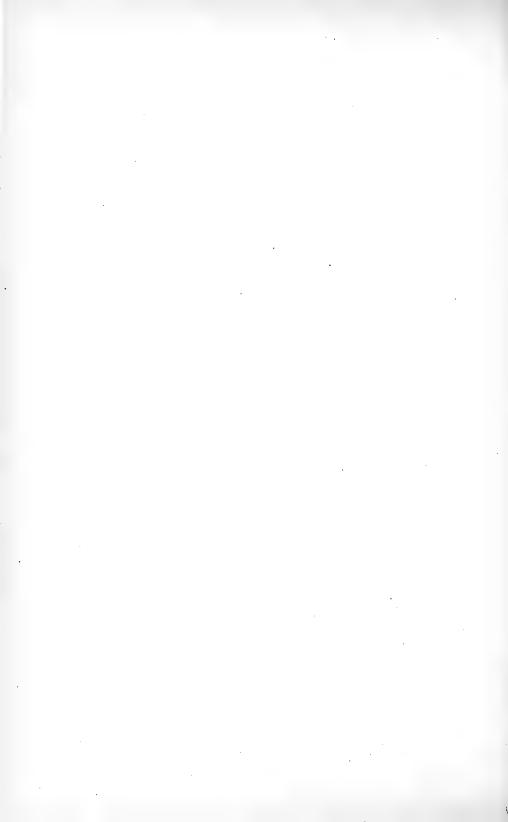
96. P. mitopus, K. Schum. in Engl. Pft. Ost-Afr. C. 103. Culms weak, geniculate, probably rambling in other vegetation. Leaf-sheaths glabrous; blades lanceolate, $2\frac{1}{2}$ in. by 5 lin., sparingly hairy. Panicles axillary and terminal on long very slender peduncles, dichotomous or trichotomous. Spikelets collected on the ends of the primary or secondary branches, elliptic in outline, $1\frac{1}{2}$ lin. long. Glumes very thin; the lower one-third the length of the upper. Lower floret equalling the upper glume. Upper floret: valve papery, polished.

Mozambique Distr. German East Africa: Usambara; in woods, *Holst*, 514 b. Said to be similar to *P. laticomum*, Nees, but much more delicate.

97. P. Notarisii, Aschers. ex Schweinf. Beitr. Fl. Aethiop. 301; Durand & Schinz, Consp. Fl. Afr. v. 756 (name only).

Nile Land. Sennar (collector not stated).





98. P. nyanzense, K. Schum. in Engl. Jahrb. xxiv. 333. Culms erect, simple, slender, over 1 ft. high. Leaves conspicuously distichous; sheaths broad, 11-2 in. long, longer than the nodes and imbricate, usually quite glabrous, very rarely softly ciliate; ligule short, rounded, glabrous; blades triangular-lanceolate from a narrowed base, tightly folded with involute margins, yellowish. Panicles open; common axis angular, quite glabrous, smooth. Spikelets 1¹/₄ lin. long. Lower glume ovate, acute, over one-third the length of the upper, which is yellowish, frequently with a violet margin. Lower floret of: valve similar to the upper glume and subequal in length. Upper floret slightly shorter than the lower, polished.

Mozambique Distr. Lake region: Bukoba, Stuhlmann, 3302.

The leaf-blades are stated to be "elongate-triangular-lanceolate" and relatively short (pro rata brevi), but the actual dimensions given are $1\frac{1}{3}-2$ in. (6-8 cm.), rarely 4 in. (10 cm.) by hardly more than $1\frac{1}{2}$ lin. I cannot suggest any affinity for this plant.

99. P. Pauli-Ducis, Hochst. ex Schweinf. Beitr. Fl. Aethiop. 301; Durand & Schinz, Consp. Fl. Afr. v. 768 (name only).

Nile Land. Sennar: Duke Paul of Würtemberg.

100. P. prælongum, Steud. Syn. Pl. Glum. i. 73. Culms erect, reed-like, up to over 3 ft. high, quite glabrous and glaucous. Leafsheaths hairy at the nodes and the mouth; blades linear, acuminate, 1½-2 ft. by 1-2 lin., flat below, convolute upwards. Panicle erect, contracted, almost 1 ft. long, its base enclosed in the uppermost sheath; lower branches approximate, upper solitary, undivided at the base, long, flexuous; pedicels long or short. Spikelets ovate in outline, 1 lin. long, quite glabrous. Lower glume ovate, subacute, nerveless, upper equalling the barren lower floret and like this obscurely nerved. Upper floret \(\beta \), delicately transversely rugose.— Durand & Schinz, Consp. Fl. Afr. v. 759.

Upper Guinea. "Guinea," Herb. Lenormand.

101. P. pseudoagrostis, Steud. Syn. Pl. Glum. i. 71; Durand & Schinz, Consp. Fl. Afr. v. 760.

Upper Guinea. Senegal, Leprieur.

This cannot be a Panicum if the description is correct. It is said to have very small spikelets without a lower glume and with the upper glume and the lower valve united ("subcoalitæ"). see p. 559 rote

102. P. scalare, Mez in Engl. Jahrb. xxxiv. 138; not of Schweinf. Perennial, up to 1½ ft. high. Culms decumbent, very slender, rooting from the nodes. Leaf-sheaths obtusely keeled upwards, with long partly tubercle-based hairs, bearded at the nodes; ligule reduced to a transverse rim; blades lanceolate or ovate-lanceolate from a rounded but not amplexicall base, shortly acute or subacute, spreading, $1\frac{1}{4}$ in. by $3\frac{1}{5}$ lin., flat, with erect stout hairs on both sides or almost glabrous below, margins markedly cartilaginous and minutely spinulose-serrulate, often crisped on one side, midrib obscure. Panicle long-exserted, pyramidal, subsecund, remotely and irregularly divided to the third degree, about 2 ft. long; common axis slender, angular, glabrous, scabrid, upwards wavy; branches suberect or somewhat spreading, the lowest a quarter the length of the panicle, compressed, very scabrid; pedicels minute, sparingly Spikelets secund, mostly paired or the uppermost solitary, strigose. elliptic in outline, acute, 1 lin. by $\frac{5}{5}$ lin., green to black-violet, shortly hairy, obscurely veined. Lower glume one-third the length of the spikelet, narrowly rotundate, 3-nerved; upper glume distinctly shorter than the lower floret (about as long as the upper), elliptic, obtuse, 5-nerved. Lower floret barren: valve similar to the upper glume; valvule acute, obscurely and loosely hairy. Upper floret \(\), narrowly elliptic, subacute, very minutely mucronate with the mucro pilosulous, straw-coloured: valve and valvule coriaceous, glossy, the latter distinctly 2-carinate.

Mozambique Distr. German East Africa: Kilimanjaro, Volkens.

This is referred to \S Brachiaria by the author, but I am unable to suggest its distinct affinity either within that genus or in Urochloa to which the mucronate fertile floret points. Nor can it well be a Panicum in the sense understood here.

103. P. sparsum, Schumach. in Schumach. & Thonn. Beskr. Guin. Pl. 64. Culms erect, terete, glabrous. Leaf-sheaths tight, striate, long-bearded at the mouth; blades up to over 1 ft. long, 1½ in. broad, glabrous, rough. Panicle virgate, almost 1 ft. long; branches very slender, straight, erect; branchlets capillary, angular, glabrous; pedicels unequal in pairs or fascicles of 3–4. Spikelets oblong, smooth, "2-flowered." Upper floret ⋈, coriaceous, rugulose.

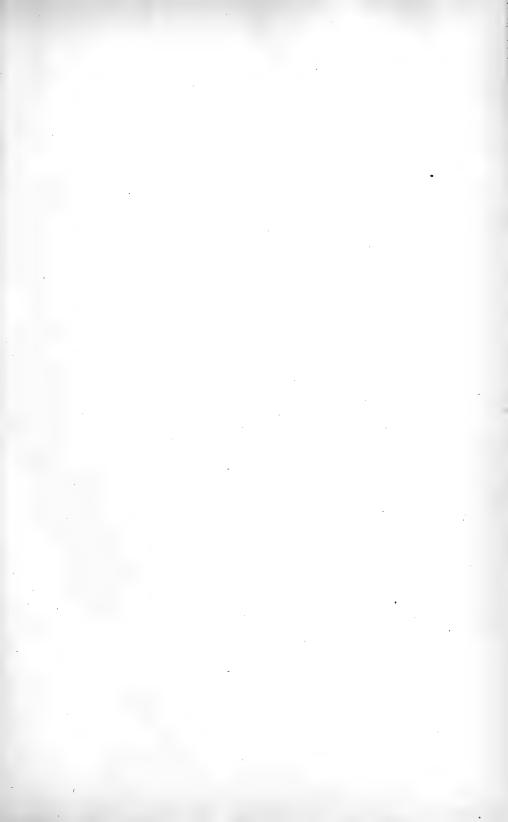
Upper Guinea. Gold Coast (?), Thonning. Probably P. maximum, Jacq.

104. P. Stuhlmannii, K. Schum. in Engl. Pfl. Ost-Afr. C. 102. Culms up to 2 ft. high, ascending from a geniculate branched base. Leaf-sheaths soft, villous; blades up to $1\frac{2}{3}$ in. long, pubescent, margins often crisped. Panicle $3-3\frac{1}{2}$ in. long, with spreading subflexuous branches; pedicels long, hairy. Spikelets frequently congested, hardly 1 lin. long. Glumes hairy; lower hardly one-quarter the length of the spikelet. Lower floret 3: valve with a violet margin. Upper floret: valve rugulose.

Mozambique Distr. Lake region: Bukoba, Stuhlmann, 4092.

105. P. tristachyoides, Trin. Gram. Suppl. in Mém. Acad Sc. Pétersb. 6me sér. iv. ii. 106; Durand & Schinz, Consp. Fl. Afr. v. 766.

Upper Guinea. Sierra Leone (collector not stated). Evidently not a *Panicum*.



7 . Parcicio 638 - 738

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70A. ENTOLASIA, Stapf.

Spikelets lanceolate-oblong to lanceolate, acute or acutely subacuminate, slightly compressed from the back, falling entire from the pedicels, solitary or (the lowest of a raceme) 2-nate, secund or subsecund and adaxial on the very slender subtriquetrous rhachis of spiciform paniculately or upwards racemosely arranged racemes; lower floret barren; upper floret \(\). Glumes unequal; the lower reduced to a minute nerveless hyaline scale, appressed to the base of the lower floret, upper corresponding in outline and size to the spikelet, membranous, very faintly to obscurely 5-nerved. Lower floret reduced to the valve, very like the upper glume. Upper floret: valve papery to almost membranous, with the margins not hyaline, delicately villous or villosulous, obtuse and muticous, very faintly nerved; valvule equal to the valve, 2-nerved with bluntly involute margins and rather narrow flaps. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted above the middle of the spikelet. Grain elliptic in outline, dorsally compressed, more convex on the back than on the face; scutellum rotundateelliptic, less than half the length of the grain; hilum punctiform, basal.—Perennial. Leaf-blades flat, papery; ligule reduced to a ciliate rim. Racemes subsessile or sessile on and appressed to the primary branches of an open or contracted panicle or upwards representing primary branches. Spikelets quite glabrous outside.

Species 2, in tropical Africa.

Closely approaching in the structure of the inflorescence and the shape of the spikelets to *Panicum meyerianum* and *Eriochloa*, but differing from both in the perfectly muticous thin-valved finely villous or villosulous fertile florets, the complete suppression of the valvule of the lower floret and the absence of any trace of a swelling of the axis at the base of the spikelets. In the key adopted in this work, *Entolasia* might be placed near *Eriochloa*.

Spikelets over 2 lin. long, acute, pale straw-coloured ... 1. E. imbricata.

Spikelets 1½ lin. long, acutely acuminate, dull green ... 2. E. olivacea.

1. E. imbricata, Stapf. Perennial from a short rhizome, up to 4 ft. high; cataphylls of the innovations appressedly silky. Culms erect, simple, rather stout at the base, 3-4-noded, internodes much shorter than the sheaths except the uppermost which is long-exserted. Leaf-sheaths rather firm, increasing in length upwards, the basal 1-2 in., the uppermost much over 1 ft. long, the lower keeled upwards, otherwise terete, glabrous except at the silkily bearded nodes; ligule a ciliate rim; blades linear, slightly attenuated or equally wide at the base, more or less tapering to an acute sometimes subcallous point, 3-6 in. by 3-4 lin., flat, somewhat plump, glabrous and smooth except near the tips, margins cartilaginous, midrib slender, raised downwards on the underside, lateral nerves very fine to indistinct, sometimes 4-5 primary nerves standing out from the rest below. Panicle terminal, over ½ ft. long, very narrow,

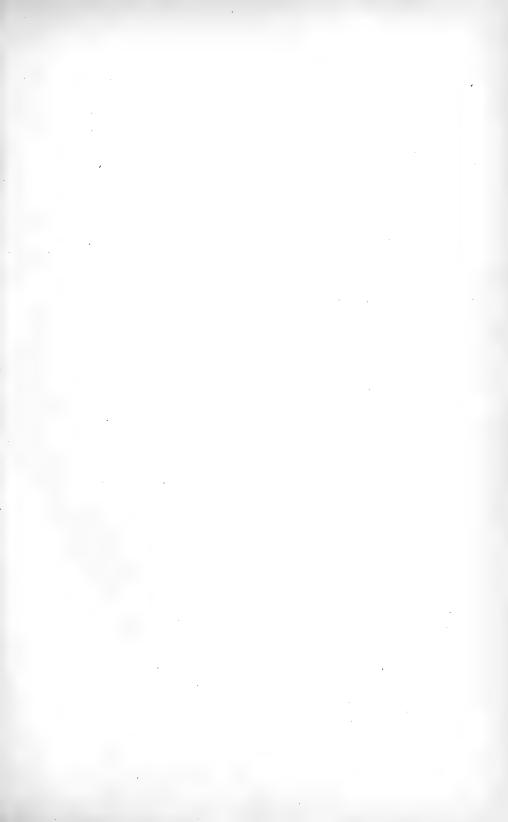
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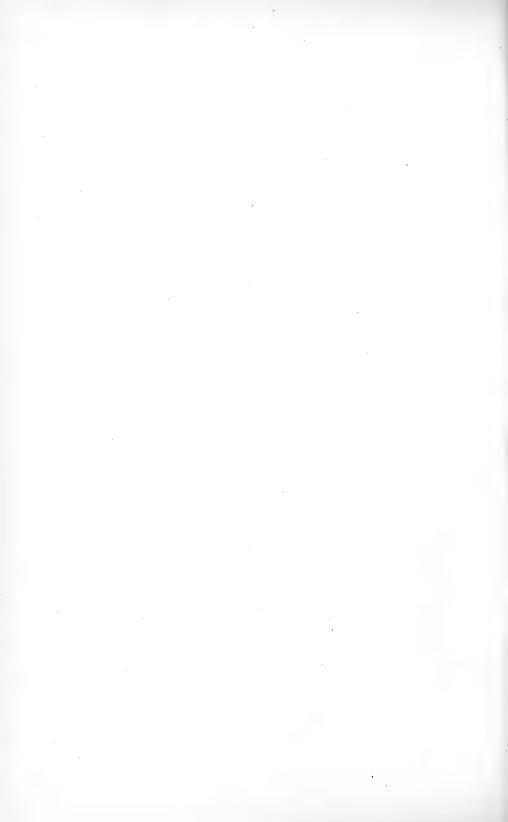
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slightly flexuous, glabrous; common axis slender, angular, compressed and scaberulous upwards, internodes irregularly long (up to 1½ in.) and short; primary branches erect, solitary, up to over 3 in. long, the longest undivided up to \frac{1}{2} and even 2 in. from the base, or with some quite rudimentary spikelets low down, slender, subflexuous, triquetrous with marginate scabrid angles, the lower bearing at the base secondary branches, otherwise like all the upper branches simple; all the branches and branchlets forming dense secund spiciform racemes. Racemes $\frac{3}{4}$ to over 1 in. long; rhachis triquetrous, scabrid, often wavy, internodes \frac{1}{2}-1 lin. long; pedicels very short, somewhat stout with scabrid angles or reduced to mere stumps, with truncate slightly cupular tips. Spikelets imbricate, 2-ranked, lanceolate-oblong, acute, dorsally rather markedly compressed, $2\frac{1}{4}$ - $2\frac{1}{2}$ lin. long, very pale. Lower glume much wider than high, obtuse, about one-fifteenth the length of the spikelet, hyaline, nerveless; upper glume faintly 5-nerved in transmitted light, otherwise apparently nerveless. Lower floret reduced to a valve exactly like the upper glume. Upper floret \mbeta , oblong, obtuse, 2 lin. long, pale; valve papery, delicately hairy, very faintly 5-nerved, with narrowly involute margins; valvule similar in substance, the lateral keels sharply set off from the thinner back, passing on the other side gradually into the blunt inflexed flaps; anthers $1\frac{1}{4}$ lin. long.

Mozambique Distr. German East Africa : Unyamwezi, 3600 ft., 5°5 S. Lat. 33° E. Long., Speke & Grant !

2. E. olivacea, Stapf. Perennial, up to 2-3 ft. high, with a decumbent copiously rooting and apparently early disintegrating Culms erect, geniculate (sometimes repeatedly), branched, many-noded, internodes shorter than the sheaths or at length usually more or less exserted from them, terete, striate, glabrous. Leafsheaths rather tight, terete, slightly keeled upwards, more or less subherbaceous, prominently striate, slightly and minutely hairy at the nodes and with a transverse dorsal fringe of hairs at the junction with the blade, otherwise quite glabrous and smooth or, rarely, with some stiff minutely tubercle-based hairs; ligule a densely ciliate rim; blades linear-lanceolate from a suddenly constricted and rounded base, very acutely acuminate, 3-51 in. by 4-6 lin., flat, papery, glabrous and smooth except along the cartilaginous scabrid and on one side markedly crisped margins, midrib not or indistinctly differentiated on the face, very slender but prominent on the back, primary lateral nerves about 4 on each side, mostly faint with equally faint secondary nerves and short transverse veins in the intervals. Panicles terminal, 5-6 in. long, contracted or (temporarily?) wide open, somewhat flexuous, glabrous; common axis very slender, terete and smooth below, angular and scaberulous above, internodes 3-1 in. long; primary branches erect or (temporarily?) widely spreading, solitary or here and there 2-nate, up to over 3 in. (lower) or





 $1\frac{1}{2}$ -1 in. (upper) long, mostly divided from the base or the lowest undivided for a distance of 8 (very rarely 2) lin., subflexuous, triquetrous, with scaberulous angles; secondary branches appressed or subappressed to the primary, forming somewhat dense secund or subsecund spiciform racemes. Racemes about 3 (or the lowest sometimes up to over 5) lin. long; rhachis finely filiform, $\frac{1}{15} \frac{1}{20}$ lin. wide, wavy, compressed, scaberulous, internodes not much over ½ lin. long; pedicels very fine, filiform, the longer flexuous, up to or sometimes \frac{3}{4} lin. long, with minute discoid tips. Spikelets irregularly ranked, those of one rank hardly contiguous, lanceolate, acutely acuminate, dorsally moderately compressed, 1\frac{1}{4} lin. long, olive-green, often slightly flushed with lurid purple, particularly upwards, one-tenth to one-twelfth the length of the spikelet, hyaline, nerveless; upper glume 5-nerved with the nerves more prominent upwards. Lower floret reduced to a valve exactly like the upper Upper floret \lozenge , elliptic-oblong in outline, obtuse, $\frac{7}{8}$ lin. long, pale: valve very thinly papery, loosely and delicately villous, obscurely 5-nerved; valvule similar in substance and hairiness, lateral keels obscure, flexures obtuse; anthers up to \(\frac{1}{4} \) lin. long. Grain broad-elliptic in outline, 1 lin. by \(\frac{3}{5} \) lin., pale.—Panicum entolasium, Stapf ex Cheval. Sudania, 60, 99 (name).

North Central. Eastern Shari: Senoussi country; in woods between the Koddo river and Kaga M'Bra, Chevalier, 6492 bis!

Lower Guinea. French Congo: Brazzaville, Chevalier, 4034! Belgian Congo: Stanley Pool Distr.; Kisantu, Gillet, 1059! 1072! 1224! 1226! Kwango Distr.; Lutschima, Vanderyst, 2855!

70B. HEMIGYMNIA, Stapf.

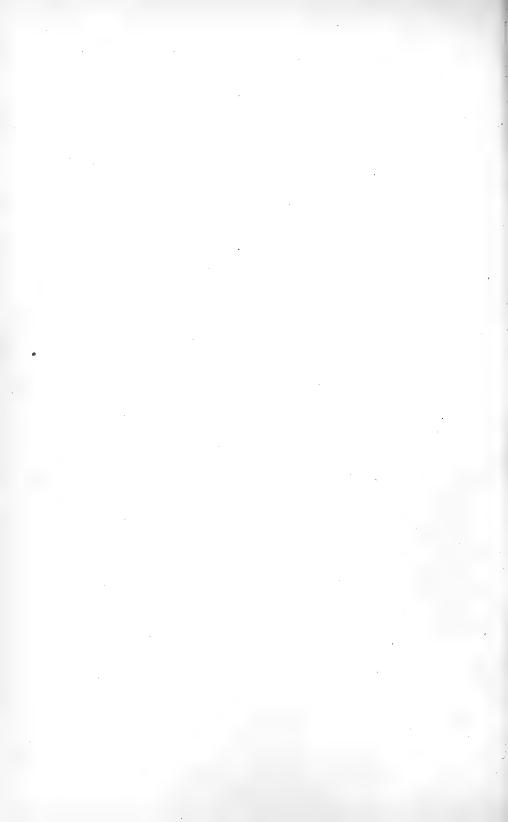
Spikelets oblong, acute, dorsally compressed, falling entire from the pedicels of short to very short racemes, disposed on the filiform branches of a contracted or widely open panicle, abaxial or without definite orientation towards the axis; lower floret reduced to the valve; upper floret as long as or almost as long as the lower, \overline{\times}. Glumes similar and of about equal size, much shorter than the spikelet, firmly membranous, lower 3-, upper 3-5-nerved. Lower floret: valve corresponding in shape and size to the spikelet, slightly depressed on the back, 7-nerved. Fertile floret: valve subcoriaceous, with the margins very narrowly hyaline and ciliolate upwards, smooth, obsoletely 5-nerved; valvule equal to the valve, embraced by it all along, finely 2-nerved, of the same texture. Lodicules 2, minute, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted above the middle of the spikelet. Grain elliptic in outline, dorsally much compressed, almost flat on both sides; hilum basal, punctiform; embryo not quite half the length of the grain.—Perennial, with long geniculate scrambling culms or a decumbent freely rooting base. Blades linear-lanceolate to lanceolate, flat, firmly papery; ligules very short and membranous to obscure.

Racemes or fascicles more or less distant, often irregularly so, or here and there approximate; rhachis filiform; pedicels finely filiform, short to as long as or (the terminal) longer than the spikelet. Spikelets usually approximate to subimbricate, glabrous or nearly so.

Species 3-4, one in tropical Africa, the others in the Indo-Malayan region. Panicum nodosum, Kunth (Hemigymnia multinodis, Stapf), together with P. canaliculatum, Nees ex Steud., forms a section "Brevigluma" in Hooker's Flora of British India. The circumstance that the glumes of both species are of about equal length and at the same time so short that the greater part of the back of the fertile floret is exposed, might at the first glance suggest affinity, but neither the habit nor the structure of the spikelet—except for the character alluded to—supports that view. In fact P. canaliculatum, "a very peculiar species," as Hooker calls it, finds its closest allies among the species of Setaria in which the "bristle" apparatus is reduced to a minimum, whilst P. nodosum and its congeners represent a small group of closely allied species the affinity of which is not quite clear, but may perhaps be looked for in the neighbourhood of Ichnanthus and Pæcilostachys. There is some resemblance to Digitaria, but it is merely superficial.

to Digitaria, but it is merely superficial. 1. H. arnottiana, Stapf. Perennial, scrambling from an often decumbent rooting base, up to over 6 ft. high. Culms many-noded, much geniculate, branched below and here and there also upwards, terete, hard and more or less woody below, glabrous and very smooth; internodes shorter or longer than the sheaths. Leaf-sheaths tight, rather firm, terete, finely striate, quite smooth and glabrous except along the upwards ciliolate margins (African specimens) or sometimes hirsute with tubercle-based finally deciduous hairs, at length circumscissile at the base and deciduous; ligule a very obscure membranous rim; blades linear-lanceolate to lanceolate from a suddenly much constricted almost petioloid base and, finally disarticulating there, acuminate with a subsetaceous point, 3-6 in. by 4½-10 lin., flat, firmly papery, dark and often dull green, minutely puberulous at the constricted base, otherwise quite glabrous, rough near the tips, sharply serrulate-scabrid along the margins, midrib slender, prominent below, primary lateral nerves very slender, 4-5 on each side with very faint oblique and sometimes meandering transverse veins and pellucid dots or striæ (lacunæ in the parenchyma). Panicle terminal, erect, slightly flexuous, more or less exserted from the uppermost sheath or its base enclosed in it, 5-9 in. long, contracted and subfastigiate or widely open; common axis angular, smooth, lower internodes $\frac{3}{4}$ to over $1\frac{1}{2}$ in. long, the following often irregularly decreasing; primary branches frequently 2-nate to pseudoverticillate or, particularly upwards, solitary, erect or spreading at an angle of 60° or more, up to three-quarters the length of the panicle, filiform, angular, scabrid, divided from the base but with the lowest divisions often quite rudimentary, the next often remote (in large panicles up to 2 in. from the base), the following usually irregularly distant or approximate, representing short racemes or fascicles, rarely long and again branched. Racemes sessile, up to 10-spiculate and over 3 lin. long, but mostly much shorter and often





reduced to clusters of 6–3-spikelets; rhachis finely filiform, wavy, scabrid; pedicels very fine with discoid tips, scaberulous, $\frac{1}{2}$ –1 lin., or sometimes up to 2 lin. long and then flexuous. Spikelets ovate-lanceolate to linear-oblong, acute or acuminate, $1\frac{1}{2}$ – $1\frac{3}{4}$ lin. long, quite glabrous (in the African specimens). Glumes similar, ovate to ovate-lanceolate, acute, lower one-third to two-fifths the length of the spikelet, 3-nerved; upper slightly longer, 5- (rarely 7-) nerved. Lower floret: valve 7-nerved, nerves distinct. Upper floret $\not\sqsubseteq$, pale, smooth; anthers 1 mm. long. Grain oblong-elliptic, obtuse, sides slightly thickened.— $Panicum\ arnottianum$, Nees ex Steud. Syn. Pl. Glum. i. 59. $P.\ nodosum$, Franch. Contr. Fl. Congo Franç. in Bull. Soc. Hist. Nat. Autun, viii. 346 (reprint, 38); Hook. f. Fl. Brit. Ind. vii. 43, and in Trim. Handb. Fl. Ceyl. 145; not of Kunth. $P.\ malabaricum$, Merrill in Philipp. Journ. Sc. iv. 248.

Lower Guinea. French Congo: Bangui, *Chevalier*, 10956! Brazzaville, in woods along the Djowe river, *Thollon*, 4087! Mpila plain, *Thollon*, 386. Belgian Congo: Stanley Pool Distr.; Wombali, *Vanderyst*, 4518! 4519! Kibambeli, *Vanderyst*, 4153!

Widely distributed in the Indo-Malayan region, as far as the Philippines. Apparently very variable as to size and lignification of the lower parts of the culms. All the African specimens examined have glabrous spikelets and leaves (except along the margins of the sheaths), whilst in the Indian material the glumes are frequently ciliolate and the leaves hairy.

In the Philippine Journal of Science, iv. 248, Merrill identified this plant with Poa malabarica, Linn., and he named it consequently Panicum malabaricum. This was done on Munro's authority who had referred the original of *Poa malabarica* in the Linnean Herbarium to *Panicum nodosum*, and on the assumed identity of certain Philippine specimens with the plant figured in Rheede, Hort. Malab. xii. t. 45, and quoted by Linnæus with his original description of Poa malabarica. The comparison of Panicum nodosum (sensu lat. auct.) with the plate quoted— Merrill saw only a rough tracing of it—and the accompanying text shows, however, at a glance that the two plants are not identical, even generically. Linnæus must have come to the same conclusion; for in the second edition of his Species Plantarum the reference to Rheede is wanting. What Rheede's plate represents may be doubtful, but I would suggest that it was drawn from a specimen of Diplachne fusca. However, Linnæus' quotation is of little importance in this instance. His description was not made from it but from a specimen in his collection. This is still in excellent preservation and is evidently a member of the "Panicum nodosum" group but characterised by its small spikelets. No locality or collector is quoted, but from the two facts (1) that Osbeck in his Voyage to China and the East Indies, ii. 29 and 343, quotes Poa malabarica and (2) that the Linnean specimen is a perfect match of specimens collected since in Hongkong (Happy Valley Woods, Wilford, no. 254) we may safely assume that Linnæus had the grass from Osbeck who collected it near Canton on Dec. 17, 1751. The observation in Species Plantarum ed. i. "Habitat in Indiæ arenosis" may be explained either by the loose way in which the term India was used in those days or as a consequence of Linnæus' mistaken identification of the plant of Rheede who says of it (p. 83) "arenoso gaudens solo."

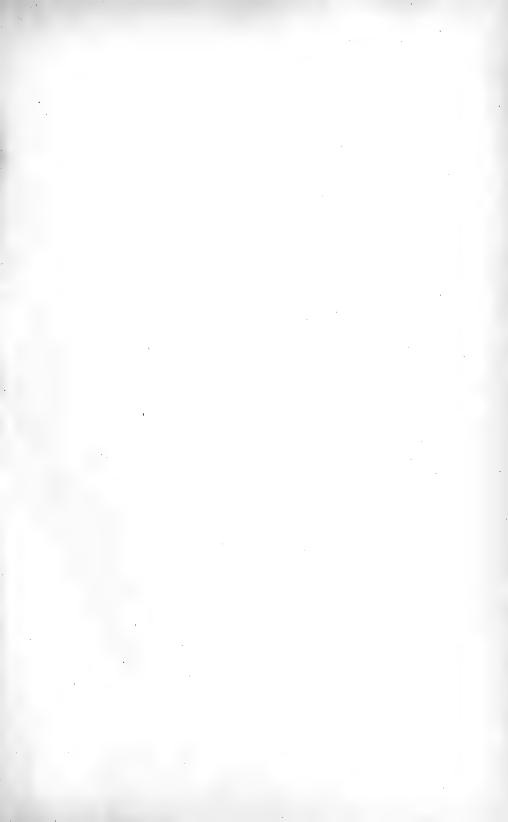
71. ICHNANTHUS, P. Beauv. Agrost. 56, t. xii. fig. i.

Spikelets lanceolate to oblong or elliptic, acute or acuminate, more rarely obtuse, slightly laterally compressed, rounded on the back and

front and sometimes turgid, falling entire from the pedicels or after shedding the ripe false fruit, solitary or downwards 2-nate, secund or subsecund and adaxial, or without definite orientation, on the very slender filiform terete or more or less angular rhachis of racemosely or paniculately arranged racemes; lower floret of or barren, upper Glumes similar, although usually unequal, herbaceousmembranous, 3-7-nerved. Lower floret: valve more or less like the upper glume; valvule thinly membranous to hyaline, more or less developed. Upper floret \(\timeg\); valve muticous, firmly coriaceous. the margins variously modified at the base, forming a short wing, decurrent on the internode and collapsed in the dry state, but swelling out when wetted, or more or less produced into auricles of sometimes considerable size; valvule subequal to the valve, of similar substance, with bluntly involute margins, clasped all along by the valve. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted at or above the middle. Grain oblong, dorsally flattened, convex on the face; scutellum elliptic, about half the length of the grain; hilum rather large, elliptic, basal. -Perennial. Blades lanceolate to ovate with a much constricted more or less oblique base, sometimes contracted into a short petiole, rarely linear and narrowed towards the base, faintly transversely veined. Racemes loose or contracted, often compound. Spikelets frequently rather large, with herbaceous glumes.

Species over 25, in the tropics of both hemispheres, but mostly American.

1. I pallens, Munro in Benth. Fl. Hongk. 414. Perennial, up to 2 ft. high, with a creeping rooting base. Culms slender, geniculately ascending from the prostrate base, the upright portions 7-8-noded and sparingly branched, easily compressible, striate, with alternate pubescent lines, lowest internodes (particularly the prostrate) more or less compressed, the upper terete. Leaf-sheaths rarely over \(\frac{1}{2} \) in. long, much shorter than the internodes, tight, subherbaceous, densely ciliate along the margin, with a densely hairy transverse line at the junction with the blade, otherwise glabrous or loosely and usually very sparingly hairy, prominently finely striate; ligule a membranous ciliolate rim; blades lanceolate to ovate-lanceolate from a much constricted oblique base, acutely acuminate, $1\frac{1}{2}-2$ in. by 4-9 lin, flat, thinly papery, dark green above, quite glabrous or minutely and very sparingly hairy below, somewhat rough above, margins scaberulous, midrib hardly different from the distant primary lateral nerves, 3-4 on each side, secondary nerves about 5 in each interval, extremely fine, transverse veins numerous, delicate. Panicles terminal and lateral (from 1 or 2, rarely 3, uppermost leaves), very shortly exserted or with their base enclosed in the supporting sheath, 2-3; in. long, slightly nodding, narrow to very narrow, green, the terminal divided to the third or fourth degree, with 1-3 basal branches, the latter up to 3 in. long; common axis and





primary branches filiform, more or less angular or compressed. glabrous, rarely pubescent downwards, smooth below, scaberulous upwards: lower primary branches distant (by up to more than 1 in.), the following much more approximate, solitary, erect or subcrect, forming like the secondary branches of the lower part of the panicle shortly peduncled to sessile sparingly compound or simple racemes 15-6 lin. long, and loose or moderately contracted; pedicels unequal, where paired, one 1 lin, or less, the other up to over 2 lin. long, angular, scaberulous, truncate. Spikelets lanceolate, acutely acuminate, about 21 lin. long. Glumes glabrous or finely hairy along the margins, lower two-thirds to over three-quarters the length of the lower floret, lanceolate in profile, more or less setaceously acuminate, 5-nerved, upper as long as or sometimes slightly shorter or longer than the lower floret, similar to the lower glume, but broader and more oblong in profile with a shorter less narrow acumen or when flattened out shortly acute, prominently 7-nerved. Lower floret imperfectly of: valve similar to the upper glume but hardly acuminate, quite glabrous, 7-nerved, finely keeled upwards; valvule broad-oblong with wide flaps and scaberulous keels, more or less reduced; anthers rudimentary. Upper floret &, oblong, obtuse, 1 lin, by almost \frac{1}{2} lin., polished, white or pale brownish, on maturity with its median plane at right angles to that of the spikelet, the lower third of the margin occupied by a shallow whitish depression which on wetting swells out into a semitransparent narrow wing continued downwards along the supporting internode; valvule hardened towards the minutely saccate base.—Doell in Mart. Fl. Bras. ii. ii. 290: Hook. f. Fl. Brit. Ind. vii. 60; Hitchcock & Chase in Contr. U.S. Nat. Herb. xviii. 334. Apluda Zeugites, Aubl. Hist. Pl. Guian. ii. 933, excl. syn.; not of Linn. Panicum pallens, Sw. Prodr. 23, & Fl. Ind. Occ. i. 164; Kunth, Enum. i. 89; Nees, Agrost. Brasil. 137; Trin. Pan. Gen. 232, in Mém. Acad. Pétersb. 6me sér. iii. 320, and Sp. Gram. Ic. t. 211; Steud. Syn. Pl. Glum. i. 93; Griseb. Fl. Brit. West Ind. 550. P. vicinum. Bailey. Syn. Queensl. Fl. Suppl. iii. 82.

Upper Guinea. Sierra Leone: Mamaha, Thomas, 4635! 4571! Cameroons: Efulen, Bates, 271!

Also throughout tropical America and a large part of the Indo-Malayan region as far as New Guinea and Queensland.

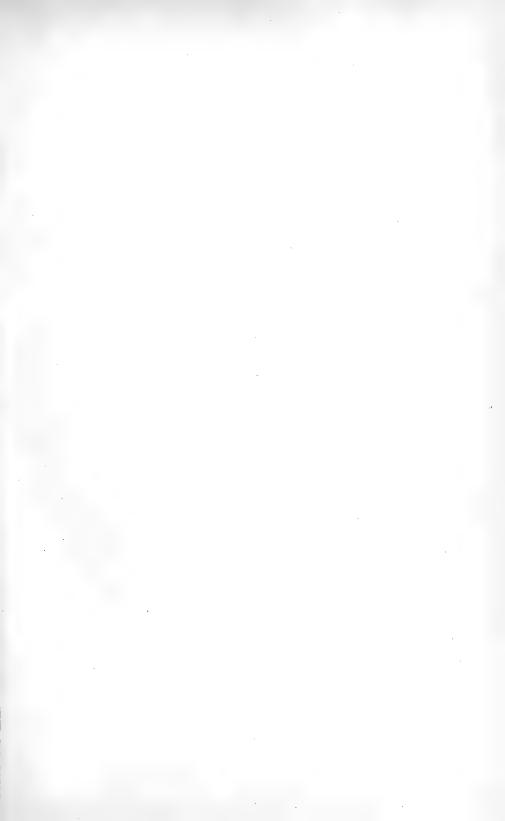
72. CYRTOCOCCUM, Stapf.

Spikelets obliquely obovate to semi-obovate, laterally much compressed, falling entire from the pedicels of very loose and open or contracted and dense panicles; lower floret barren with or without a valvule; upper floret about as long as or almost as long as the lower, ξ . Glumes thinly membranous, unequal to subequal, 3-5-nerved. Lower floret: valve similar to the upper glume; valvule, if present, narrow, 2-nerved. Fertile floret: valve narrowly boat-shaped,

papery to subcrustaceous with firm very narrowly involute margins, obsoletely 5-nerved; valvule subequal to the valve, with a narrow convex back, of the same substance as the valve, with fine keels and thin flaps. Lodicules 2, minute, broadly cuneate. Stamens 3. Styles distinct; stigmas sublaterally exserted high up. Grain unknown.—Perennial with weak culms rising from a decumbent or creeping and rooting base. Blades flat, linear-lanceolate to lanceolate or almost linear; ligules membranous, short. Spikelets on long to very long and capillary or short pedicels and accordingly widely scattered or approximate.

Species 6 or 7, mostly confined to the Malayan region.

(Beauv.) 1. C. setigerum, Stapf. Perennial, 1-3 ft. high. Culms geniculately ascending or with a prostrate base, rooting from the nodes. more or less branched, with the branches erect, terete, smooth and glabrous, the erect culms or portions of culms 7-8-noded, internodes mostly shorter than the sheaths or at any rate not long-exserted. Leaf-sheaths tight, but the lower soon slipping off the culms and inrolled, subherbaceous, shortly and often scantily pubescent at the nodes, ciliate along the outer margin, often bearded at the mouth. otherwise glabrous and smooth, striate; ligules membranous, rounded, 1 lin, long; blades linear-lanceolate to sublinear from a more or less narrowed base, tapering to a very fine point, 3-5 in. by 4-5 lin., flat, thin, soft, dark green, long and finely fimbriate-ciliate at the base, otherwise finely and appressedly hairy or glabrescent, slightly rough on the face and along the margins, midrib very slender, whitish and slightly prominent below, primary lateral nerves about 3 on each side, very fine. Panicles terminal on the culms and their branches, enclosed with their base in the uppermost sheath, obovate to broad-oblong in outline and very loose and open or more or less contracted, 4-9 in. long, divided up to the third, rarely the fourth degree; primary axis slender, like all its divisions terete, loosely beset with long and short silky hairs and very minutely scaberulous except downwards where it is smooth, internodes unequal from over 1 in. to a few lines; primary branches solitary or paired or in scanty false whorls, remotely divided from \(\frac{1}{2} - 1\frac{1}{2}\) in from the base, finely filiform or like its divisions capillary and flexuous, the latter up to over 1½ in. long, bearing 3-2 distant or only 1 spikelet, rarely again divided: pedicels short (if axes of the third or fourth order) to long or very long (over 1 in.). Spikelets broadly and obliquely obovate to semi-obovate in outline, laterally much compressed, up to 1 lin. long, dark olive-brown, very loosely scattered. Glumes very unequal, thinly membranous; lower lanceolate-acute in profile, broad-ovate if flattened out, one half to two-thirds the length of the lower floret to which it is tightly appressed, obscurely scaberulous and sparingly and minutely hairy, 3- to sub-5-nerved; upper obliquely oblong with a curved back, subacute, almost as long as the spikelet, ciliolate and





loosely silkily hairy on the back, faintly 5-nerved. Lower floret: valve oblong (in profile), obtuse, very similar to the upper glume but with a straight back. 3- to sub-5-nerved : valvule more or less reduced, very narrow, 3-nerved. Upper floret &, almost semi-obovate or semi-elliptic, apiculate at the tip, subacute at the base, up to over 78 lin. long, narrowly boat-shaped, brown, minutely punctate all over: valve and valvule papery, at length subcrustaceous, the former very obscurely 5-nerved with firm very narrow margins, the latter with a narrow oblong convex back, finely and transparently winged keels and thin flaps; anthers \(\frac{1}{2}\) lin. long. Grain unknown.—Panicum setigerum, P. Beauv. Fl. Owar, i. 82, t. 49, and Agrost. 171, t. x. fig. 3, and Expl. pl. 8; Poir. Encycl. Suppl. iv. 280; not of Retz. P. chatophoron, Roem. & Schult. Syst. Veg. ii. 884; Kunth, Enum. i. 113; Trin. Pan. Gen. 219, and in Mém. Acad. Pétersb. 6me sér. iii. 307; Steud. Syn. Pl. Glum. i. 87; Durand & Schinz, Consp. Fl. Afr. v. 742: Stapf in Johnston, Liberia, ii. 667. P. patens, Rendle in Cat. Afr. Pl. Welw. ii. 183: not of Linn.

Upper Guinea. Liberia: within 20 miles of Kakatown, Whyte! Gold Coast: Aburi Hills, Johnson, 286! Southern Nigeria: Lagos, MacGregor, 312! Benin, Beauvois! Old Calabar, Robb! Northern Nigeria: in damp places, Kabba Road, Parsons, 28! Cameroons: Batanga, Bates, 85! Spanish Guinea: Bebai, Tessmann, 636!

Lower Guinea. Angola: Golungo Alto; in primitive woods on Monte de Queta, Welwitsch, 7210! mountains of Alto Queta, Welwitsch, 7263! 1086

(carp. coll.) !

73. RAMPHOLEPIS, Stapf. (See under 74. SACCIOLEPIS.)

74. SACCIOLEPIS, Nash in Britt. Man. Bot. 89.

Spikelets oblong to ovate-oblong or elliptic or lanceolate, subterete or laterally compressed, frequently more or less oblique (seen in profile), usually somewhat turgid, falling entire from the short finely filiform pedicels of a spiciform very rarely open panicle; lower floret of or barren; upper \(\Delta \). Glumes similar in structure but unequal, the lower being much shorter, softly or rigidly membranous with a narrow hyaline margin or hyaline tip, stiffened by the hardening of the prominent and often rib-like nerves, or more or less dissimilar owing to the reduction of the lower glume to a small hyaline scale, or its differentiation into a narrow hardened obscurely nerved back and broad hyaline margins; upper glume with a curved or basally gibbous or saccate back, always much concave, mostly 7- or 9-, rarely 5- or up to 13-nerved. Lower floret: valve very dissimilar to the upper glume and of the same or almost the same length, but with a straighter back (except 10, S. cymbiandra); valvule narrow, hyaline, finely 2-keeled, shorter than the valve, sometimes more reduced or quite rudimentary. Upper floret: valve oblong in outline (when seen from the back), very convex, chartaceous,

ultimately subcrustaceous, with firm narrowly involute margins, obscurely 5-nerved; valvule almost as long as the valve, tightly embraced by it all along and of the same texture, 2-nerved, hardly keeled. Lodicules 2, small, broadly cuneate. Stamens 3. Styles distinct; stigmas long, loosely plumose, exserted terminally or subterminally. Grain tightly enclosed by the somewhat hardened valve and valvule, elliptic in outline, dorsally compressed, with an almost flat back and convex face; hilum punctiform; embryo more or less half the length of the grain.—Annual or more often perennial grasses; blades linear and flat or filiform-convolute, or filiform-subulate. False spikes often very dense and dark or variegated; spikelets mostly rather small.

Species over 30, in the tropics of both hemispheres.

The section Rhampholepis corresponds to what was intended to form the genus Rampholepis as proposed on p. 15 of this volume. A closer survey of Sacciolepis as represented by the species with spiciform panicles has since led to the conclusion that the structure of the spikelets of Rhampholepis conforms to such a degree with that of Sacciolepis proper (Sect. Eusacciolepis) that a generic separation of Rhampholepis resting solely on the loosening of the panicle cannot be maintained.

*Inflorescence spiciform.

Branches fused with the axis of the false spike; pedicels crowded all along it singly or in pairs or rarely in small fascicles; spikelets laterally compressed, 2 lin. long; lower glume with a narrow hardened back and hyaline margins; valve of lower floret with a transverse fringe of hairs (see also 15, S. transhertet). Applying recesser Seat Panaguer.

S. transbarbata). Annual grasses: Sect. Ramifusæ. False spike much attenuated downwards, bearing there imperfect tightly appressed spikelets, 1 in. by 4 lin. (upwards); perfect spikelets broad, ovate-elliptic; upper glume 7-nerved with a line of tubercle-based hairs along each side of the keel and the margins

False spikes not or very slightly attenuated downwards; spike ½-1 in. by 3-4 lin., all the spikelets perfect, lanceolate; upper glume 9-nerved, uniformly shortly pubescent all over

Branches not or imperfectly fused with the axis of the false spike. Annual or perennial grasses: Sect. EUSACCIOLEPIS.

Spikelets $\frac{3}{3} - \frac{1}{2}$ lin. long; glumes rigid, ribbed; upper glume and lower valve 7-nerved. Culms up to $2\frac{1}{2}$ ft. high; spikes $2\frac{1}{2} - 5$ in. by $1 - 1\frac{1}{4}$

lin.

Culms 3–6 in. high; spikes 1 in. by 1 lin. or less, rather loose

Spikelets over $\frac{1}{2}$ lin. long. Spikelets $\frac{3}{4}$ l lin. long.

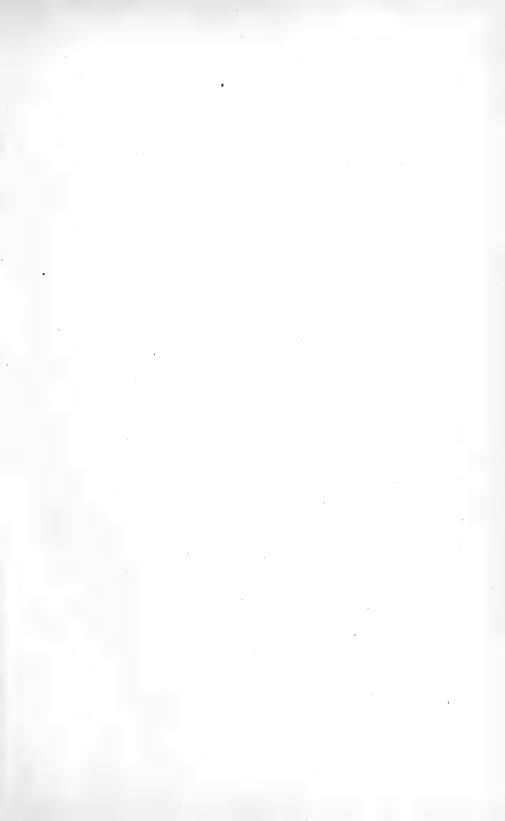
Perennial with dense tufts of leaves from which the slender few-noded culms rise; leaf-blades fleshy or spongy, elliptic in cross-section with a narrow frontal channel and 2 wide grooves on each side, very smooth.

1. S. ciliocincta.

2. S. cinqularis.

3. S. micrococca.

4. S. nana.



briotists to

False spike up to 5 in. by $1\frac{1}{2}$ —2 lin., loosely pubescent with minutely tubercle-based hairs, pale grevish-green to straw-coloured: spikelets $\frac{3}{4}$ l lin. long; nerves blunt, pale; leaf-blades up to 6 in, long

5. S. Chevalieri

False spikes up to $1\frac{1}{2}$ in. by $1\frac{1}{2}-\frac{3}{4}$ lin., glabrous or delicately pubescent, olive-green with fine purple nerves and dark tips or almost entirely dark purple: spikelets 3 lin. long: leaf-blades up to over 2 in. long ...

6. S. brevifolia

Annual, 3-6 in. high with short flowering branches and only one culm-node, or up to 1 ft. high with long erect flowering branches and 2-3 culm-nodes; leaf-blades thin, flat or folded, $1\frac{1}{2}$ -6 in. by $\frac{1}{2}$ - $\frac{3}{4}$ lin.; false spikes $\frac{3}{4}$ —2 in. by $1-1\frac{3}{4}$ lin., olivegreen; spikelets $\frac{3}{4}$ —7 lin. long; glumes very thinly and softly membranous with purple nerves and dark tips

7. S. huillensis.

Spikelets 1-2½ lin. long.

Annual, tufted, 3-4 in. high; blades $1-1\frac{3}{4}$ in. by $1-1\frac{1}{2}$ lin.; false spikes $\frac{1}{3}-\frac{3}{4}$ in. by $1\frac{3}{4}-2\frac{1}{4}$ in.; spikelets 1 lin. long, quite smooth and glabrous; lower glume 5-, upper 7-9nerved ...

8. S. spiciformis.

Perennial.

Spikelets 1-11 lin. long (see also 16, S. auriculata), or if 2 lin, long then with a transverse fringe of hairs and with a 13-nerved upper glume (15, S. transbarbata); glumes and lower valve thin and softly membranous between the nerves which may be rigid and thickened, or very fine, rarely the lower valve thickened below (see 10, S. cymbiandra).

Axis of false spike rather stout and more or less stiff, up to over 1 lin. in diam, and up to over 12 in. long; basal sheaths up to 6 in. long, spongy and cross-barred; apparently all aquatic perfectly glabrous

grasses.

Leaf-blades flat, up to over 1 ft. by 3-6 lin.:

spikelets over 1 lin. long.

Spikelets oblong, obtuse to subacute, dorsally slightly compressed to almost terete, bright yellowishgreen with darker or brownish tips 9. S. interrupta.

Spikelets broad-ovate, acuminate, laterally compressed, asymmetric with the lower floret narrowly boatshaped and gibbous and hardened below

... 10. S. cymbiandra.

Leaf-blades filiform-convolute, up to 1 ft. by $\frac{1}{3}$ lin. in diam. $(1-1\frac{1}{3})$ lin. when flattened out); spikelets 1 lin. long 11. S. scirpoides.

Axis of false spikes slender, hardly rigid; basal sheaths short or if long (13, S. typhura) then not spongy, but rather firm and closely nerved; spikelets hairy (except 12, S. glaucescens).

Spikelets without a transverse fringe of hairs, in dense spikes; upper glume and lower valve 7-9-nerved.

Spikelets quite glabrous, obtuse or subacute to acute owing to the inrolling of the hyaline tips of the upper glume and lower valve; leaves glaucous; basal sheaths short, wide. more or less spongy; blades mostly convolute, rigid, up to 6 in. long ... 12. S. glaucescens.

Spikelets more or less hairy, very dark. Culms rigidly erect, simple; leaf-blades more or less rigid, 6-12 in. by $1\frac{1}{2}$ -5 lin.; false spikes 3-10 in. by 3 lin. 13. S. typhura.

Culms very slender, ascending in wide curves like their remote branches; leaf-blades soon flaccid, 3-6 in. by $l_{\frac{1}{2}}$ lin. (flat); spikes $\frac{3}{4}$ $l_{\frac{1}{2}}$ in. by

Spikelets with a transverse fringe of silvery hairs; false spikes lobed or much interrupted or very scanty, 1½ in. by 2½ lin.; upper glume 13nerved; lower valve 11-nerved

Spikelets $2-2\frac{1}{4}$ lin. long, or if $1\frac{1}{2}$ lin. long then the sheaths auricled at the mouth; glumes (or at least the upper) rigidly or firmly membranous, glabrous, rarely hairy (sometimes in 16, S. auriculata), nerves rather rib-like, sometimes evanescent downwards.

Leaf-sheaths auricled at the mouth; culms collapsing when dried, ascending from a decumbent and rambling base with long aerial roots from the nodes: blades up to over 6 in. by $1\frac{1}{2}-2$ lin., flexuous; spikes 1-6 in. by $3-3\frac{1}{2}$ lin.; spikelets pale, glabrous or hairy ...

Leaf-sheaths not or obscurely auricled (17, S. leptorrhachis); spikes rather short, rarely over 3 in. long.

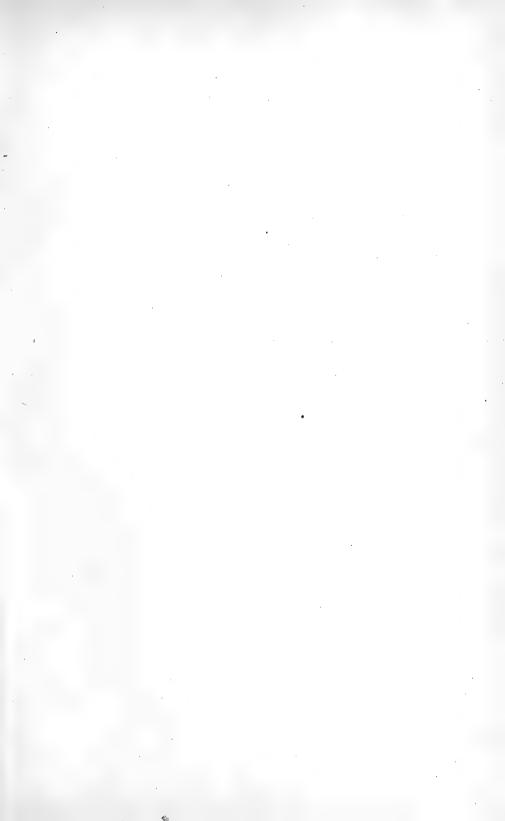
Nervation of glumes and lower valve distinct; spikelets yellowish or olivegreen, darker upwards.

Culm-bases hardly wiry, the culms above it up to 5- or more-noded, collapsing when dried; sheaths with obscure auricles or shoulders; false spikes up to 4 in. long, continuous or irregularly interrupted; spikelets ovatelanceolate, more or less oblique ... 17. S. leptorrhachis

... 14. S. incurva.

... 15. S. transbarbata.

... 16. S. auriculata.



See 141. Secondary to the Adoption white in Si di sou en coloria 111000110 Rhaderia Raviner 2087, 7.1.

Culm-bases hard to wiry, erect or very shortly ascending with short often bladeless sheaths, simple below, then sparingly branched forming a scanty erect tuft; the following culm with only 1 or 2 nodes above the base.

False spike compact, $\frac{2}{3}-1\frac{1}{2}$ in. long; spikelets ovate-oblong; upper glume and lower valve rather firm and bluntly ribbed

... 18. S. ses!erioides.

False spikes lobed or interrupted or reduced to a succession of scanty clusters and solitary spikelets; spikelets lanceolate-oblong; upper glume and lower valve less firm with slender ribs

... 19. S. catumbensis.

Nervation of the hard glumes and lower valve more or less obscure, at least downwards, ribs as far as visible blunt; spikelets pale straw-coloured to almost whitish; false spikes rather loose, less than 1 in. long

... 20. S. albida.

**Inflorescence an open or temporarily contracted panicle with subcapillary to capillary branches, bearing distantly loose racemes of 7-2 oblique gibbous gaping spikelets; lower glume reduced to a minute scale:

Sect. Rhampholepis

... 21. S. curvata.

1. S. ciliocincta, Stapf. Annual, gregarious, up to 1½ ft. high. Culms erect, terete, spongy, up to 2 lin. in diam. near the base, 5-6-noded, simple or sparingly branched with the branches 2-noded, uppermost internodes (peduncles) slender, 4-6 in long, lowest 1 or 2 nodes emitting stilt-roots. Leaf-sheaths quite glabrous and smooth, the lower somewhat spongy and loose, the upper tight, all pale, faintly striate, not or very obscurely auriculate at the mouth. but mostly with a small rounded shoulder; ligule membranous. rounded, up to 1 lin. long; blades erect, mostly overtopping the spikes, linear from a more or less (in the lower leaves often long) attenuated base, tapering to a callous point, 3-9 in. by $1-2\frac{1}{2}$ lin., flat, convolute in the upper part, somewhat plump, densely whitishpapillose above on the nerves, otherwise glabrous and smooth, midrib and nerves very fine. False spike erect, straight, subcylindric. narrow downwards, about 1 in. long, very compact, bearded; pedicels springing direct singly or in pairs from the slender common axis, minutely and loosely hairy, very short, tips discoid. Spikelets laterally much compressed, broad ovate-elliptic in side view, acutely acuminate, 2 lin. long, straw-coloured, bearded. Lower glume oblong, subacute, with the sides suddenly widened at the base, over half the length of the spikelet, with a firm narrow finely 3-nerved back, near the tip with a small beard of hairs, margins hyaline, narrow upwards; upper boat-shaped, almost keeled, obliquely

oblong in profile, curved with a slender recurved acumen, membranous, finely 7-nerved, with a longer or shorter fringe of tubercle-based hairs along the margin and along each side of the keel. Lower floret barren: valve similar to the upper glume and of about the same length, but less curved on the back, 7-nerved on each side, with a large triangular hyaline window-like area at the base and an oblique fringe of tubercle-based hairs (up to $\frac{3}{4}$ lin. long) ascending from the middle of the keel, the tips of the valves hyaline above the fringe; valvule narrowly linear, somewhat shorter than the valve, finely 2-keeled, with very narrow flaps from the middle downwards. Upper floret $\mbox{\normallel{\subsym}}$, oblong, acute, 1 lin. by $\mbox{\normallel{\subsym}}$ lin., white, polished. Grain oblong-elliptic in outline, $\mbox{\normallel{\subsym}}$ lin. by $\mbox{\normallel{\subsym}}$ lin.; scutellum ellipticoblong, exceeding the middle of the grain; hilum suprabasal, punctiform.— $Panicum\ ciliocinctum$, Pilger in Engl. Jahrb. xxxiii. 48.

Nile Land. Jur: Ghattas' Great Seriba, Schweinfurth, 2420!

2. S. cingularis, Stapf. Annual (?), probably up to 2 ft. high. Culms geniculately ascending from a decumbent rooting base with the roots partly aerial, terete, up to 2 lin, diam., smooth and glabrous, branched with the branches in scanty tiers, all flowering, internodes 3-4 in, long, the lower laid bare by the slipping off of the sheaths; branches of a tier unequal, the outermost up to 1 ft. long, the inner gradually shorter, all branches of 2 internodes, the upper about double the length of the lower. Leaf-sheaths coarsely striate. shortly hirsute, the lower wide and almost papery, about 3 in. long, upper tight and more herbaceous; ligules membranous, whitish, truncate, up to 1 lin. long: blades linear, mostly imperceptibly passing into the sheaths, long-tapering to a callous point, of lower leaves flat and up to 6 by $2\frac{1}{9}$ lin., or those of the branches very short and subulate-convolute, rather plump, very loosely and finely hairy, densely papillose above on all the nerves, otherwise quite smooth, midrib and primary lateral nerves (2 on each side) slender, more or less differentiated from the very fine prominent secondary nerves. False spikes at length long-exserted on slender flexuous peduncles, cylindrical, 1-\frac{1}{3} in. by 3-4 lin., very compact; pedicels very short, somewhat stout, very sparingly puberulous, closely appressed to and rising direct singly or in pairs from the common axis, tips discoid. Spikelets lanceolate, acuminate, symmetrical or more or less oblique, 2 lin. by 3 lin., pale greyish-green, bearded. Lower glume lanceolate, acute to subacute, over three-quarters the length of the spikelet, with a firm narrow finely 3-nerved back, on each side with a row of fine rigid hairs inside the wide hyaline margin; upper ovate (when flattened out), acuminate, membranous, 9-nerved, shortly and loosely hairy all over, often with some long hairs on the sides. Lower floret 3: valve very similar to the upper glume, if not more abruptly acuminate and of equal length, 9-nerved, glabrous or almost





so except for a transverse fringe of rigid white hairs, up to almost 1 lin, long, at first appressed to the tip, then more or less spreading: valvule linear-oblong, subacute, three-quarters the length of the valve; anthers ½ lin. long. Upper floret \(\), oblong, subacute, 1 lin. by $\frac{2}{5}$ lin., white, polished.—Panicum indicum, Chev. Sudania. 102 (not elsewhere).

North Central. Shari Territory: Senussi Country: about Kago Die. Chevalier, 6658!

3. S. micrococca, Mez in Fedde, Repert, xv. 122. Annual, growing in tufts or clumps, up to 2½ ft. high. Culms erect, very slender from a stouter base, filiform upwards, smooth and glabrous like the whole plant, rarely with more than 3 distinctly elongated internodes, the uppermost by far the longest, the intermediate about 3-4 in, long, more or less shortly exserted, the lowest shorter than the sheaths. Basal leaf-sheaths loose, wide, spongy, up to 1-3 in, long, glaucousgreen, collapsing when dry and then often more or less sulcate. the upper tight and narrower to very narrow, sulcate-striate, with rounded shoulders at the mouth; ligules hyaline, very short, truncate, subciliolate; blades filiform to setiform, folded, with an acute to subacute point, up to 6 in. long, $\frac{1}{4} - \frac{1}{2}$ lin. wide (when folded), soft, flexuous, sulcate-striate when dry, papillose on the face, midrib fine, obtuse, lateral nerves 3-4 on each side. False spikes longexserted, erect, straight or flexuous, cylindric, $2\frac{1}{2}$ -5 in. by $1-1\frac{1}{4}$ lin., dense or more or less interrupted; common axis very slender; pedicels very short and fine, smooth or almost smooth with discoid tips. Spikelets elliptic-oblong, subacute to obtuse, turgid, symmetrical, not quite \frac{1}{2} lin. long, olive-green or brown or lurid. Glumes very thin, very finely but distinctly nerved; lower broad-ovate from a clasping base, subacute, 3-nerved, rather thin, less to slightly more than half the length of the spikelet; upper broadly rounded on the back, corresponding in outline and size to the spikelet, 7-nerved. Lower floret barren: valve very similar to the glume and of the same length; valvule reduced to a minute hyaline scale. Upper floret \forall . elliptic-oblong, subobtuse, up to $\frac{3}{8}$ lin. by $\frac{1}{5}$ lin., greyish-white, polished.—Panicum myosuroides, Durand & Schinz, Consp. Fl. Afr. v. 755; Rendle in Cat. Afr. Pl. Welw. ii. 174; Pobéguin, Ess. Fl. Guin. Franc. 215; not of R. Br.

Upper Guinea. Senegambia: without precise locality, Heudelot, 551! French Guinea: Kouroussa, in water, Pobéguin, 536! 541 (partly)! North Nigeria: Borgu, in ricefields, Barter, 759!

Nile Land. Jur: Ghattas' Great Seriba, Schweinfurth, 186! 2570 (Herb.

Kew)!

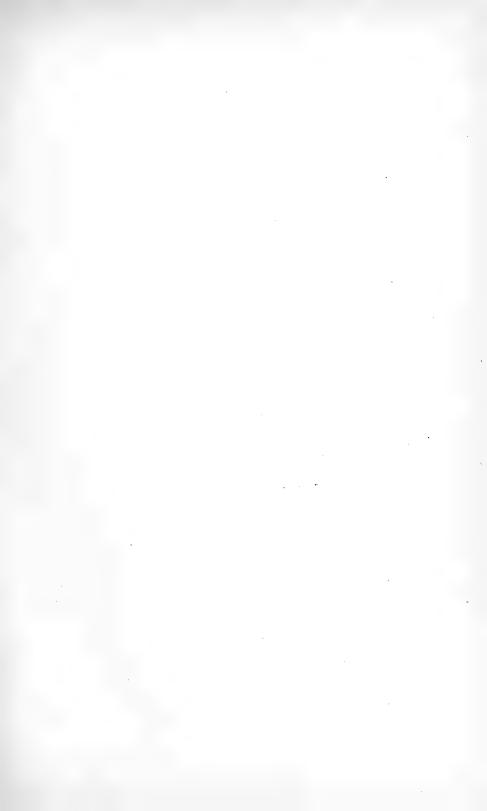
4. S. nana, Stapf. Annual, growing apparently gregariously and forming small tufts, excluding the flowering culms 2-3 in, high. Culms erect up to slightly over 6 in. high, very slender, filiform, smooth and glabrous like the whole plant, with rarely more than

2 distinctly elongated internodes, the uppermost by far the longest, the preceding 1-2 in. long, shortly exserted. Basal leaf-sheaths loose, widened downwards, spongy but thin, \(\frac{1}{2}\)-\(\frac{3}{4}\) in. long, pale leadcoloured, the upper tighter to tight, sulcate-striate with minute truncate shoulders; ligules hyaline, very short, truncate, ciliolate; blades filiform to setiform, folded, with an acute or subacute point, from less than 1-2 in. long, up to over $\frac{1}{4}$ lin. wide (when folded), soft. suberect, delicately 7-nerved, papillose above on the nerves. False spikes more or less to long exserted, erect, straight, $\frac{3}{4}$ - $1\frac{1}{2}$ in. by $\frac{1}{2}$ - $\frac{3}{4}$ lin., very slender and somewhat loose, with the racemules 12-2 lin. long and more or less distinct; axis very slender; pedicels short, smooth, with minute discoid tips. Spikelets oblong to elliptic-oblong in outline, acute to obtuse (when mature), symmetrical, slightly turgid, up to slightly over \(\frac{1}{5}\) lin. long, olive-green or brownish. Glumes very thin, very finely nerved; lower ovate, subacute, 3-nerved, two-thirds the length of the spikelet; upper corresponding in outline and size to the spikelet, 7-nerved. Lower floret barren; valve similar to the glume and of the same length; valvule ovate-lanceolate, nerveless, 1/8 lin. long or quite rudimentary. Upper floret \(\xi\), elliptic-oblong, acute, $\frac{3}{8} - \frac{1}{2}$ lin. by $1\frac{1}{4}$ lin., pale, polished.—*Panicum myosuroides*, var. sudanensis, Stapf ex Cheval. Sudania, 87, 88, 102, and in Miss. Chari-Lac Tchad, Étud. Fl. Afr. Centr. Franc. i. 363 (name only),

North Central. Upper Oubangui: M'Brous country; Kaga Do, Chevalier, 5911! 5921! Boma Poste, Chevalier, 59614! Upper Shari: Dar Banda; Kaga M'Bra, Chevalier, 6643!

This is possibly a stunted condition of *S. micrococca*, but the facies of the extremely slender spikes is very peculiar, their racemules being more or less marked out instead of being merged in the cylindrical arrangement of the spike, whilst the spikelets point more forward than they do in *S. micrococca*. All the specimens quoted were evidently growing in black mud.

5. S. Chevalieri, Stapf. Perennial, densely tufted on a short oblique rhizome, up to 2 ft. high; innovations intravaginal. Culms erect, very slender, smooth and glabrous, 2-3-noded, with the uppermost node at the middle or well below it, the lower internodes mostly shorter than the sheaths. Basal leaf-sheaths loose, wide, more or less spongy, up to 3 in. long, brownish or grey or suffused with livid purple, upper tight, green, sulcate-striate when dry, all with rounded minutely puberulous shoulders at the mouth, otherwise glabrous and smooth; ligules short, truncate, ciliolate; blades erect, filiform, subterete or laterally slightly compressed, 5-angular and 5-sulcate with the frontal groove deepest, up to 6 in. by hardly \frac{1}{2} lin. in diam., spongy, quite glabrous, none of the vascular bundles with sclerenchymatic girders. False spikes erect on at length long-exserted peduncles, cylindric, $1\frac{1}{2}$ -5 in. by $1\frac{1}{2}$ -2 lin., more or less dense, continuous or here and there slightly interrupted; common axis very slender; pedicels very short or up to \(\frac{3}{4}\) lin. long, puberulous. lets ovate in outline, acute or acuminate, symmetrical or slightly



64 0. at inter ! Pelag Avilla, Debrudt 408.

oblique when gaping, up to 1 lin. long, pale greyish-green to straw-coloured, loosely puberulous with the hairs tubercle-based. Glumes thinly membranous, ovate; lower subobtuse, over half to two-thirds the length of the glume, 5-nerved; upper acute, 7-nerved with the nerves fine, but ultimately prominent. Lower floret \mathcal{J} : valve very similar to the upper glume, but less puberulous; valvule three-quarters the length of the valve, narrow. Upper floret \mathcal{J} , ovate, subobtuse, $\frac{1}{2} - \frac{2}{3}$ lin. long, whitish, polished; anthers $\frac{1}{2}$ lin. long.—

Panicum Chevalieri, Stapf in Cheval. Sudania, 10, 106, 124 (name only).

Upper Guinea. French Sudan: Upper Niger; between Sanguiana and Moussaia, Chevalier, 466!
North Central. Upper Shari: Senussi Countri, Ndelle, Chevalier, 6820!

Kounde, Chevalier, 7714!

6. S. brevifolia, Stapf. Perennial, densely tufted. Culms very slender, rising 6-9 in. from the short dense basal tufts of leaves. 1-2-noded with the upper node 2-3 in. above the base, simple. glabrous and smooth. Leaf-sheaths somewhat firm, the basal more or less compressed and keeled, imbricate, 1-1 in. long, obscurely auricled, those of the culm somewhat tighter and very narrow with a more pronounced shoulder or auricle, the uppermost up to $2\frac{1}{2}$ in. long, all loosely striate, smooth and quite glabrous except at the ciliate mouth and (sometimes) upper margins; ligules very short. hyaline, ciliolate; blades subsetaceous with a callous point, convoluteplicate, up to over 2 in. long, and up to \frac{1}{2} lin. across, those of the uppermost culm-leaf very much shorter, plump, green, sulcate on the back, glabrous and smooth. False spikes erect on a long-exserted peduncle, cylindric, $1\frac{1}{2}$ in. by $1\frac{1}{3}-1\frac{3}{4}$ lin., dense; pedicels very short, with a few minute hairs, tips minutely discoid. Spikelets ovate in outline. broadly rounded on the back, symmetrical or suboblique, acute, turgid, at maturity more or less gaping, up to \(\frac{3}{4}\) lin. by \(\frac{3}{8}\) lin., glabrous or with a few minute hairs or loosely pubescent, olive-green, richly tinged upwards with dark lurid purple. Glumes thin, finely nerved; lower broad-ovate, obtuse to subobtuse, about half the length of the spikelet or more, 5-nerved with the nerves anastomosing; upper obliquely oblong in profile, acute or subacute, 5- or sub-7-nerved. Lower floret \mathcal{A} : valve very similar to the upper glume and of the same length, 7-nerved; valvule somewhat shorter, oblong; anthers 1/3 lin. long. Upper floret \(\), elliptic-oblong, subacute, \(\frac{1}{2} \) lin. by \(\frac{1}{4} \) lin.. white, polished.

Lower Guinea. Angola: Benguella; country of the Ganguellas and Ambuellas, Gossweiler, 2057!

(Rendle)
7. S. huillensis, Stapf. Annual, 3 to over 12 in. high. Culms very slender, glabrous and smooth, simple from the uppermost node but usually branched from the two preceding nodes, in dwarf specimens the lower internodes arrested, hence the plants scantily tufted

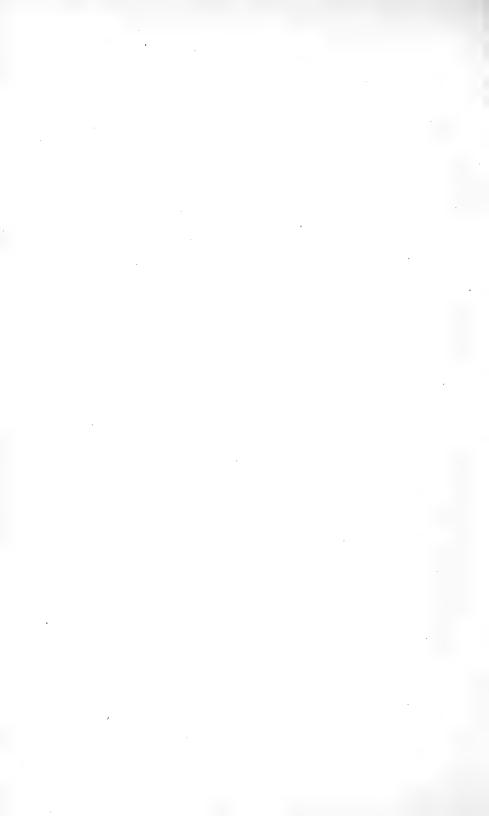
with short flowering branches from the base and a 1-noded primary culm rising above them: in elongated specimens the lower 2 or 3 nodes more or less distant, hence the branches also more or less remote and distinctly above the base, the corresponding internodes stouter and spongy, the primary culm and often also the elongated branches geniculate. Leaf-sheaths rather loose and wide, uppermost tight all thin with minute auricles or shoulders, quite glabrous and smooth: ligules membranous, truncate, very short; blades narrowly linear from an equally wide base, tapering to a minute callous point. 13 to over 6 in by 1-3 lin., flat or involute, thin, weak, green, loosely papillose to glabrous on the nerves above, midrib and lateral nerves (2 or 3) on each side) very delicate. False spikes erect on a finely filiform often long-exserted peduncle, \(\frac{2}{3}\)-2 in. by \(1\frac{1}{2}\)-1\(\frac{3}{4}\) lin., continuous and dense or slightly interrupted; axis very slender, $\frac{1}{6} - \frac{1}{4}$ lin. in diam.: pedicels fine, with few minute hairs or slightly scaberulous, tips Spikelets ovate to ovate-oblong, symmetrical, first acute. then obtuse, $\frac{3}{4} - \frac{7}{8}$ lin. long, widely gaping when mature and shedding the false fruit, tardily deciduous, olive-green mostly with dark purple nerves and tips, glabrous. Glumes very thin, finely nerved: lower broad-ovate, subobtuse or obtuse, over half to three-quarters the length of the spikelet, 3-5-nerved: upper 5-7-nerved. Lower floret barren: valve very like the upper glume and of the same length, 5-7-nerved; valvule linear, three-quarters the length of the valve or more reduced with narrow upwards evanescent flaps. Upper floret \(\), oblong, subobtuse, \(\frac{1}{2} \) lin. by \(\frac{1}{4} \) lin., brownish when ripe, polished.—Panicum huillense, Rendle in Cat. Afr. Pl. Welw. ii. 174.

Lower Guinea. Angola: Benguella; country of the Ganguellas and Ambuellas, *Gossweiler*, 3152 (partly)! Huilla; in poor damp pastures in the Humpata district, *Welwitsch*, 2699!

Mozambique Distr. Rhodesia: Mazoe, Eyles, 320! North-west Rhodesia: Choma, Rogers, 8091!

(Hochet.) 8. S. spiciformis, Stapf. Annual, tufted, 3-4 in. high. slender, erect, with a subbasal node and sometimes another \frac{1}{2} in. higher up, smooth and glabrous. Leaf-sheaths herbaceous, or pale and submembranous at the base, somewhat compressed upwards, quite glabrous and smooth, striate; ligule a very narrow glabrous membranous rim; blades linear from an almost equally wide base, tapering to a slender point, $1-\frac{13}{4}$ in. by $1-\frac{11}{2}$ lin., flat, green, soft, quite glabrous and smooth, midrib and primary lateral nerves very fine. False spike cylindric, $\frac{1}{3} - \frac{3}{4}$ in. by $1\frac{3}{4} - 2\frac{1}{2}$ lin., compact, quite glabrous; pedicels up to \frac{1}{2} lin. long with minutely discoid tips. Spikelets symmetrical or nearly so, not gaping, ovoid, somewhat plump, subacute to obtuse, 1 lin. by slightly over \frac{1}{2} lin., pale olivegreen, tinged with lurid purple upwards, quite glabrous and smooth. Lower glume broad-elliptic, obtuse, two-thirds the length of the spikelet, 5-nerved; upper broadly elliptic-oblong, subacute, 7-9nerved. Lower floret barren: valve very like the upper glume

7+5. Lebrunii Robyns affShullensis but culmo and infl. longer, hair on sphelt with black tuberculate bases.



and of the same length, but quite obtuse; valvule very much reduced, oblong, acute, with broad flaps. Upper floret $\mbox{\sc disp}$, oblong-elliptic, subacute, slightly over $\frac{1}{2}$ lin. by $\frac{1}{4}$ lin., pale, smooth: valve and valvule thinly papery, nervation quite obscure.—Panicum spiciforme, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 359; Walp. Ann. Bot. iii. 714; Steud. Syn. Pl. Glum. i. 66; Schweinf. Beitr. Fl. Aethiop. 301; Durand & Schinz, Consp. Fl. Afr. v. 765.

Nile Land. Abyssinia: in swampy places of the Shire plateau, Schimper, 1825! and without precise locality, Schimper, 1478!

(Willd) 9. S. interrupta, Stapf. Perennial from a short creeping rhizome, up to 5 ft. high, the whole plant quite glabrous and smooth. Culms slender or more often stout and spongy, at least below (up to 3 lin. in diam.), erect or ascending or with a prostrate base, and then often copiously rooting from the nodes, 5-8- (rarely more) noded, simple or sparingly branched, terete, sheathed all along, with the uppermost internode (peduncle) at length often more or less exserted (stout specimens) or intermediate and upper internodes shortly exserted. Leaf-sheaths rather loose or the lower very loose, often slipping off the culm and inrolled, herbaceous, finely and loosely striate, the lower often thin and transversely veined and if submersed sometimes bladeless; ligules whitish, membranous, truncate, up to over \frac{1}{2} lin. long; blades linear from an equally wide or slightly narrowed or contracted base, tapering to a long slender point, 4 to over 12 in. by 3-6 lin., flat, soft, somewhat plump, smooth except along the margins and towards the tips, midrib very slender, slightly raised below, primary lateral nerves 3-5 on each side, very fine but usually like the secondary nerves (3-4 per interval) sharply raised and distinct. False spike at length exserted, cylindric, from a few inches to over 1 ft. by 3-4 lin., dense; common axis somewhat stout; pedicels very short to 1 lin. long, with minute discoid tips. Spikelets oblong, subacute or obtuse, symmetrical or almost so, dorsally slightly compressed to subterete, not gaping, up to over $1\frac{1}{2}$ (or in weak specimens $1\frac{1}{4}$ lin. by $\frac{1}{2}$ lin., green, often brownish or livid purple upwards. Lower glume rotundate-elliptic, very obtuse, one-third to two-fifths the length of the spikelet, subhyaline, 5-7-nerved, with the nerves anastomosing near their ends; upper corresponding in size and outline to the spikelet, prominently 9-nerved. Lower floret barren: valve very similar to the upper glume and of equal size; valvule more or less reduced, delicately hyaline, or 0. Upper floret \(\), oblong-elliptic, acute, up to over 1 lin. by over \(\frac{1}{2} \) lin., pale, polished; valve and valvule thinly papery, then crustaceous; anthers \frac{3}{8} \frac{1}{2} \lin. long; stigmas exserted terminally; grain broadelliptic in outline, $\frac{3}{4}$ lin. by $\frac{1}{2}$ lin., subplano-convex; scutellum rotundate, less than half the length of the grain.—Panicum interruptum, Willd. Sp. Pl. i. 341; Kunth, Enum. i. 87; Roxb. Fl. Ind. ed. Carey, i. 289; Nees, Fl. Afr. Austr. 51; Griff. Notul. iii. 26, and

Ic. Pl. Asiat. t. 139, fig. 221, and t. 146, fig. 2; Steud. Syn. Pl. Glum. i. 66; Durand & Schinz, Consp. Fl. Afr. v. 751; Hook, f. Fl. Brit, Ind. vii. 40; Rendle in Cat. Afr. Pl. Welw. ii. 174; Stapf in Dyer, Fl. Cap. vii. 413; De Wild. Miss. É. Laurent, 201; Th. & Hél. Durand, Syll. Fl. Congol. 633. P. uliginosum, Roth, Nov. Pl. Sp. 50. P. inundatum, Kunth, Rév. Gram. i. 34, and Enum. i. 88: Steud. 1.c. 66. Hymenachne interrupta, Bühse in Miq. Pl. Jungh. i. 377; Mig. Fl. Ind. Bat. iii. 458; Steud. l.c. 101. P. indicum, Hack, in Bolet. Soc. Brot. v. 210; not of Linn.

Upper Guinea. Sierra Leone: Bumba, 650 ft., Thomas, 1944! 1991! Kaballa, Thomas, 2210! Mabonto, Thomas, 3555! Mamaha, Thomas, 4508! Yombana, Thomas, 4691! French Guinea: Timbo, in water, Pobéguin, 1740! Southern Nigeria: Lagos, Rowland! Opobo, Jeffreys, 16! Northern Nigeria: in stream-beds and marshes near Sokoto, Dalziel, 478! St. Thomas Island:

Macambrara, Moller, 134!

Nile Land. Jur: Ghattas' Great Seriba, Schweinfurth, 2315! Upper Nile Province: Tonga, Broun, 1467! Lado: Yei river, Sillitoe, 5! Abyssinia: bays of Lake Tsana near Grinja Mariam, Schimper, 1367! Uganda: near

Entebbe, Fyffe, 41!

Lower Guinea. Belgian Congo: Lower Congo, Smith! Stanley Pool Distr.; Kisantu, Gillet, 995! Kwango Distr.; Bandundu, Vanderyst, 4270! Lake Leopold II. Distr.; Fini marshes, Laurent! Angola: Golungo Alto (?), Welwitsch, 2963! Pungo Andongo: banks of Calunda stream, Welwitsch, 2715! South Angola: Cunene marshes, in fairly deep water, *Pearson*, 124! Mozambique Distr. Nyasaland: Karonga, *Whyte*!

10. S. cymbiandra, Stapf. An aquatic perennial over 2 ft. high (base unknown). Uppermost leaf-sheath up to over 9 in, long, tight, firmly herbaceous, quite glabrous and smooth, with short truncate shoulders at the mouth, closely striate, preceding sheath (imperfectly preserved) similar, passing straight into the blade; ligules membranous, very short, truncate; blades linear from an equally wide base, tapering to a slightly callous point, the uppermost 1-2 in. by $1\frac{1}{2}$ lin. (when flattened out), the preceding up to 6 in. by 3 lin., flat or convolute (at least upwards), somewhat plump, bright green, quite glabrous and smooth, except along the scaberulous upper margins, midrib very slender, nerves fine, obscurely raised and hardly differentiated. False spike on a long-exserted peduncle, erect, straight, cylindrical, up to over 10 in. by $2\frac{1}{2}$ lin., dense or downwards here and there slightly looser, so as to expose the axis, frequently with more or less arrested spikelets among the perfect, particularly downwards; pedicels very short, very sparingly puberulous or glabrous, smooth, tips discoid. Spikelets (perfect) broad-ovate, somewhat oblique and laterally compressed, not gaping, acutely acuminate, turgid, up to 1½ lin. by ¾ lin., glabrous, pale olive-green to brownish. Glumes membranous, prominently nerved; lower elliptic to elliptic-ovate, half the length of the spikelet, obtuse, 5-7-nerved; upper obliquely lanceolate-oblong and acute in profile, evenly curved on the back, 9-nerved. Lower floret 3: valve laterally much compressed, boat-shaped, semi-ovate in profile, very



10 + S. kimpasaensis Vanderg; Robyns
syn S. wourbaliensis Vanderg.

(S. interruption of Stapf in Vandery. list
is this in part-fide Robyns)

Congo Belge

gibbous in the lower half, acutely acuminate, as long as the upper glume, thickened and less distinctly or obscurely nerved in the gibbous part, 7-nerved; valvule lanceolate-linear, almost as long as the valve. Upper floret $\mbox{\sc dist}$, narrowly oblong, acute, $\mbox{\sc dist}$ lin. by slightly over $\mbox{\sc dist}$ lin., whitish or greyish, polished; valve thin, papery, broadly embracing the valvule.

Upper Guinea. French Guinea: Baffing Valley, in water, *Pobéguin*, 1746! The shape of the lower valve is very striking, and if quite normal would render the recognition of the species very easy.

11. S. scirpioides, Stapf. Perennial, from an oblique copiously rooting rhizome, up to over 3 ft. high, with extravaginal innovations, sometimes growing out into short stolons, with papery cataphylls. Culms erect, somewhat stout, terete, 3-noded, with the uppermost node about the middle, simple above the base, terete, smooth and glabrous. Leaf-sheaths rather loose, terete, not keeled, closely striate, the lower 2 or 3 crowded at the base, wide, spongy, papery, glabrous or very scantily and shortly hairy, the outermost of them about 1 in., the innermost up to 6 in. long, the following tighter, firmer and more herbaceous, up to over 9 in, long, all with short rounded auricles or shoulders at the mouth; ligules very short, membranous; blades filiform, convolute, with slender slightly blunt tips, nearly 1 ft. long, $\frac{1}{2}$ lin. in diam., flattened out $1-1\frac{1}{2}$ lin. wide, flexuous, quite smooth and glabrous or more or less hairy inside and above the ligule, midrib very slender, like the nerves obscure upwards. False spike on a long-exserted peduncle, cylindric, straight or slightly curved, interrupted downwards, otherwise compact or here and there looser, 3 to over 9 in. by $2\frac{1}{2}$ -3 lin.; pedicels with a few minute hairs, ½ lin. long, discoid tips minute. Spikelets broad-ovate in outline, subacute or acute, rather symmetrical, about 1 lin. by slightly over ½ lin., olive-green or brownish, with darker nerves and tips (the extreme point of the latter, however, sometimes snowwhite), glabrous. Glumes membranous, finely but prominently nerved; lower broadly ovate, clasping at the base, often slightly gibbous at the base when ripe, 5- to sub-7-nerved; upper ovate (in back view), subacute or acute, with or without a fine hyaline margin near the tip, 7-nerved. Lower floret 3: valve very similar to the upper glume, but usually more obtuse, 9-11-nerved; valvule oblong, acute, three-quarters the length of the valve; anthers $\frac{2}{3} - \frac{3}{4}$ lin. long. Upper floret \S , elliptic-oblong, acute, $\frac{3}{4}$ lin. by $\frac{2}{5}$ lin., white, polished.

Lower Guinea. Angola: Benguella; country of the Ganguellas and Ambuellas, $\cdot Gossweiler, 2579!~2672!$

12. S. glaucescens, Stapf. Perennial from a creeping rhizome, up to 1 ft. high; innovations extravaginal with pale rather thin and papery cataphylls. Culms slender, erect or shortly ascending,

terete, glabrous and smooth, 1-noded above the basal tuft of leaves. with the node much below the middle. Leaf-sheaths rather unequal. those of the basal leaf-tuft (2-3) short, wide, spongy-papery, rounded on the back, $\frac{1}{2}$ -1 in. long, the following more herbaceous, glaucous or purplish, the uppermost tight, 2 to over 3 in. long, all sparingly hairy, at least upwards, and ciliate along the margins, or the lower silkily subtomentose, closely striate, those of the base reticulate if spongy, without shoulders or auricles at the mouth; ligules very short, truncate, subhyaline; blades linear from an equally wide base, tapering to a firm almost acicular point, up to 6 in. by 1-1½ lin., rigid, mostly convolute, glaucous, somewhat plump, glabrous or more or less softly hairy, midrib and nerves very slender, slightly raised, smooth. False spike on a long-exserted peduncle, cylindric, straight or slightly curved, compact, 3-5 in: by 2½ lin.; pedicels glabrous and smooth or with a few minute hairs, tips minutely discoid. Spikelets ovate-oblong, obtuse or subobtuse, symmetrical or very slightly oblique in profile, not gaping, subterete, up to 1 lin. by ½ lin., greyish-green to greyish-purple, glabrous. Glumes finely and prominently nerved, herbaceous with hyaline white margins; lower half to over half the length of the spikelet, 5-nerved; upper ovate (in back view), subobtuse, 7-nerved. Lower floret 3: valve very similar to the upper glume and of the same length, 9-nerved; valvule narrow, linear-lanceolate, acute, up to almost as long as the valve; anthers \(\frac{2}{3}\) lin. long. Upper floret \(\frac{1}{2}\), oblong, acute, \(\frac{2}{3}\) lin. by ½ lin., white, polished.

Mozambique Distr. Mashonaland: Charter Distr., Mundy; Departm. Agric. S. Rhodesia, 2102!

(Starf) 13. S. typhura, Stapf. Perennial, tufted from a short rhizome, up to 3 ft. high. Culms erect, slender, simple, terete, smooth and glabrous, 3-4-noded, rarely more-noded with additional very short basal internodes, uppermost internode very long (up to over 1 ft.), long-exserted. Leaf-sheaths tight, rather firm, terete, very closely striate, glabrous or more or less hairy, particularly upwards, the lowest persistent; ligules membranous, truncate, very short. minutely ciliolate; blades linear from an equally wide or hardly contracted base, tapering to a slender slightly callous point, 6-12 in. by $1\frac{1}{2}$ -5 lin., erect, more or less rigid, convolute or flat, glabrous or more or less hairy to subtomentose, scaberulous to scabrid along the margins, midrib slender, lateral nerves very close and prominent. False spike erect, straight or slightly curved, 5-10 in. by 3 lin., usually very dense; pedicels rarely much over ½ lin. long, scaberulous or puberulous, with minutely discoid tips. Spikelets ovate to ovateoblong or ovate-lanceolate in outline, acute to subacuminate, rarely obtuse, usually slightly oblique, more or less turgid, 1 lin. long, purplish or blackish-grey, often very dark, more or less finely hirsute with white hairs. Glumes membranous, finely but distinctly nerved:



13+ S. Wittei Robyns aff 5. typhura but lower sheatho paperyshorigy with transverse veries; aphels 2.8-3 min long. lower broad-ovate, obtuse to acute, half or almost half the length of the spikelet; upper ovate to ovate-oblong in dorsal view, subacute to obtuse, 7–9-nerved. Lower floret \mathcal{J} : valve like the upper glume and of the same length, but less concave; valvule about three-quarters the length of the valve; anthers $\frac{1}{3} - \frac{3}{8} \lim$, long. Upper floret \mathcal{J} , ovate-oblong, acute, $\frac{1}{2} \lim$, long, whitish or yellowish.—Panicum typhurum, Stapf in Dyer, Fl. Cap. vii. 414. P. indicum, Hack. in Bolet. Soc. Brot. iii. 135; not of Linn.

Nile Land. Jur: Agada, Schweinfurth, 2591!
Lower Guinea. Huilla: Humpata; by the Nene river, Newton!
Mozambique Distr. Nyasaland: Mount Sochi, 3000 ft., Kirk! Mount
Mlanje, Adamson, 407! Namasi, Cameron, 18! Shire Highlands, Buchanan,
73!

14. S. incurva, Stapf. Perennial, up to over 1 ft. high. Culms ascending in wide curves, slender, filiform, glabrous and smooth, 4-6-noded, remotely branched with the branches ascending in similar curves to the level of the main culm. Leaf-sheaths terete. rather tight, the lower loosened and slipping off or embracing the branch, about 3 in. long, quite glabrous or minutely ciliate at the mouth, smooth; ligules thinly membranous, very short, truncate; blades narrowly linear from an equally wide base, flat or (the upper) filiform-convolute, tapering to a blunt callous point, 3-6 in. by 1½ lin. or if convolute up to \frac{1}{2} lin. in diam., the lower soon flaccid, upper flexuous, quite glabrous and loosely hairy, smooth, midrib and lateral nerves very fine. False spikes on long-exserted peduncles, 3/4-11/2 in. by 21/3 lin., dense, very dark greyish-purple; axis very slender; pedicels very short, with a few minute hairs below the discoid tips. Spikelets ovate-oblong in outline, acute to subacuminate, symmetrical, 1½ lin. by ½ lin., sparingly hairy, hairs white. Glumes rigidly but thinly membranous, nerves slender, prominent; lower ovate, acute or subobtuse, half to two-thirds the length of the spikelet, 5-nerved; upper corresponding in outline and size to the spikelet (seen in dorsal view), 9-nerved, tips hyaline. Lower floret 7: valve like the upper glume; valvule slightly shorter, linear, acute, with broad overlapping flaps; anthers $\frac{2}{3}$ lin. long. Upper floret \nsubseteq , elliptic-oblong, obtuse, $\frac{3}{4}$ lin. by $\frac{3}{8}$ lin., pale, polished.

 $\begin{tabular}{ll} \textbf{Mozambique Distr.} & German East Africa: Ukinga; Nadcheni, in mountain meadows by the water, 6500 ft., Stolz, 2484! \\ \end{tabular}$

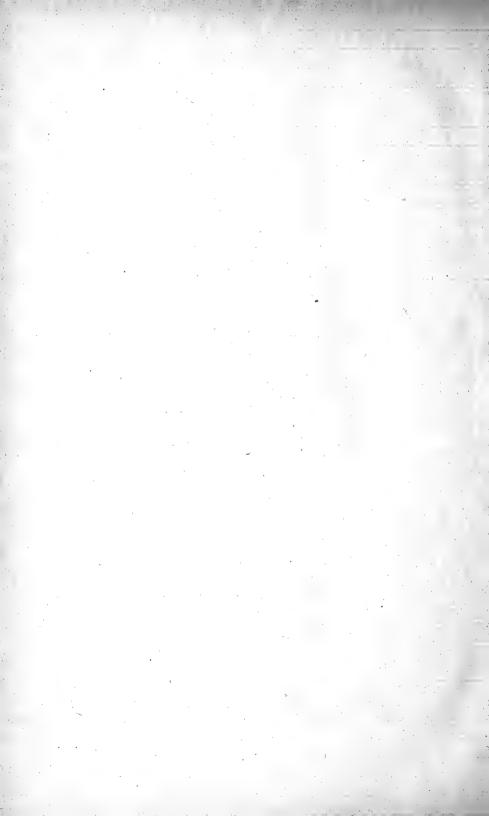
15. S. transbarbata, Stapf. Perennial from a slender oblique rhizome, about 1 ft. high. Culms in scanty fascicles, erect, very slender, terete, about 2-noded, with the uppermost node low down, simple or branched from the lower node, with the branches sometimes in tiers, smooth and glabrous. Leaf-sheaths tight, the lower rather narrow, not or very obscurely keeled, over 1 in. long, bladeless or early throwing off the short blade, the following more herbaceous, longer, the uppermost up to 4 in. long, sparingly hairy to glabrous,

finely striate, without auricles at the mouth; ligules very short. rounded or truncate, membranous, minutely ciliolate; blades linear from an equally wide or more or less attenuated base, tapering to a long fine point, 4-5 in. by 1-2 lin., flat, thin, green, loosely silkily hairy with the hairs rather long downwards, slightly rough upwards and along the very fine cartilaginous margins, midrib and lateral nerves (3 on each side) about equally fine. False spike erect on a long-exserted peduncle, cylindric, about $1\frac{1}{2}$ in. by $2\frac{1}{2}$ lin., more or less silky, lobed with the lobes made up of short rather dense compound racemes or much interrupted and sometimes extremely scanty and broken up into 3-2-spiculate racemes and solitary spikelets; common axis very slender, lobes up to 3 lin. long; pedicels smooth, up to over 1 lin. long, tightly appressed, tips discoid. Spikelets oblong, symmetrical, somewhat gaping, with the upper halves of the upper glume and lower valve almost parallel, 2 lin, long, grevishgreen or tinged with purple or brown. Glumes thin, finely but prominently nerved; lower broad-ovate, subacute, half the length of the spikelet, minutely and loosely hairy, 7-nerved; upper broadoblong (in dorsal view), subacute, uniformly loosely and shortly hairy, 13-nerved. Lower floret 3: valve very similar to the upper glume, but 11-nerved with a long transverse fringe of silvery hairs above the middle and loose short hairs above it; valvule lanceolate, acute, much shorter than the valve; anthers 1 lin. long. Upper floret \(\), oblong, subacute, 1 lin. long, white, polished; valve and valvule very thin.

Mozambique Distr. Northern Rhodesia: by the Chibenga stream, Kässner, 2087! 2157!

16. S. auriculata, Stapf. Perennial (?), up to 3 ft. high. slender, easily compressible, ascending from an often long-decumbent and rambling base emitting long (over 6 in.) aerial roots from its nodes, the erect portion about 5-noded and sparingly branched, the lower internodes soon bared by the sheaths slipping off, 2-3 in. by $1-1\frac{1}{3}$ lin., the lowest sometimes more or less compressed, the uppermost up to over 1 ft. long, all quite glabrous and smooth. Leafsheaths herbaceous, somewhat firm, prominently striate, glabrous and smooth or sparingly hairy upwards, more or less compressed and keeled upwards, produced at the mouth into acute or subacute auricles, up to 2 lin. long, shorter than the internodes; ligules thinly membranous, laterally adnate to the auricles; blades linear from a gradually attenuated or equally wide base which is much narrower than the mouth of the sheath, upwards tapering to a fine point, over 6 (rarely up to 9) in. by 1½-2 lin., flexuous, at first plicate-convolute, then flat, quite glabrous or rarely very sparingly hairy, smooth except along the upwards scaberulous margins, midrib slender, prominent below and whitish, lateral nerves 2-3 on each side, generally obscure. False spike erect on a long-exserted peduncle, straight

Company on an and advances of Lating 1



or flexuous, 1-6 in. by 3-3½ lin., dense, continuous or here and there slightly interrupted or constricted; pedicels very short, smooth, with discoid tips. Spikelets ovate, subacute to acutely acuminate, symmetrical or slightly oblique, $1\frac{1}{2}$ to over $1\frac{3}{4}$ lin. by $\frac{3}{4} - \frac{7}{8}$ lin., pale grevish-green to a warm straw-colour, glabrous or more or less hairy, with finely tubercle-based short hairs. Lower glume broad-ovate, subacute to almost obtuse in dorsal view, half or over half the length of the spikelet, thin, 5- (rarely 3- or 7-) nerved; upper broadoblong to ovate-oblong in dorsal view, tip hyaline and rather obtuse if flattened out, finely and prominently 9- (rarely 7-) nerved. Lower floret of or barren: valve very similar to the upper glume, but slightly shorter, 9-nerved; valvule narrow, distinctly shorter than the valve; anthers ¾ lin. long. Upper floret \u22005, oblong, subacute, $\frac{3}{4} - \frac{9}{10}$ lin. by $\frac{1}{3} - \frac{2}{5}$ lin., white, polished.—Panicum indicum, Rendle in Cat. Afr. Pl. Welw. ii. 174; Cheval. Sudania, 105; not of Linn.

Upper Guinea. French Guinea: Baffing Valley, in wet places, *Pobéguin*, 1745! 1745 b! Southern Nigeria: Lagos; in damp situations, *Dawodu*, 157! Northern Nigeria: Borgu, Barter, 752!

North Central. Shari Territory: Senussi Country; Ndelle, Chevalier, 6798!

Nile Land. Uganda: low swamps between Ukoko and Makaswa, 4000 ft.,

Dummer, 2951!

Lower Guinea. Angola: Pungo Andongo; in marshy meadows, near Pedras de Guinga, Welwitsch, 2826!

Panicum indicum, as understood by Linnæus, is a small weak annual with small spikes and spikelets and exauriculate leaf-sheaths. The nearest approach to it in Africa is S. spiciformis (see above, p. 756). It seems to be limited to the Indo-Malayan region from Ceylon to North Australia. The various varieties, among them var. elatum (see below under S. leptorrhachis), admitted in the Flora of British India are mostly referable to S. angusta, Stapf (Panicum angustum, Trin.). None of them has the auricled leaf-sheaths characteristic of the African plant described here.

17. S. leptorrhachis, Stapf. Perennial, up to 2½ ft. high, glabrous throughout. Culms suberect or geniculately ascending from a very slender rooting base, sparingly branched from some of the lower nodes, up to over 10-noded, lower internodes short (\frac{1}{2}-1\frac{1}{3}\text{ in.}), the lowest very slender and almost wiry, the following stouter, weaker and more or less compressed, or, if erect, terete like the upper, these 4-8 in. long or the uppermost (peduncle) up to $1\frac{1}{2}$ ft. long. Lowest leaf-sheaths short, thin, soon decaying, the following herbaceous, somewhat loose and slipping off the culm, shorter to much shorter than the adjoining internodes, rarely over 3 in. long, with short auricles or shoulders at the mouth; ligules membranous, truncate, up to ½ lin. long; blades more or less spreading, linear from an almost equally wide base, tapering to a fine point, 3-4 in. by 2 lin., flat, green, glabrous and smooth except along the minutely scaberulous margins, midrib very slender, whitish below, lateral nerves obscure. False spikes 1½-4 in. by 3 lin., rather dense, continuous or irregularly constricted or interrupted; common axis slender, up to $\frac{1}{4}$ lin. in diam.; pedicels short, up to \(\frac{3}{4}\) lin. long, smooth, tips more or less discoid. Spikelets ovate-lanceolate, acute, more or less oblique after flowering, slightly gaping with subparallel tips, $2\frac{1}{4}$ lin. long, olive-green, smooth. Glumes membranous, prominently nerved; lower broad-ovate, acute, 7-nerved; upper oblong, gently curved on the back, sub-acuminate, 9-nerved. Lower floret barren: valve very similar to the upper glume and of the same length, but with a straight back, 9-nerved; valvule much shorter, linear, with narrow flaps. Upper floret $\mbox{\ensuremath{\notrell}}$, oblong, acute, over 1 lin. by $\frac{1}{3}$ lin., whitish, polished.— Panicum indicum, var. elatum, Rendle in Cat. Afr. Pl. Welw. ii. 174; not of Hook. f.

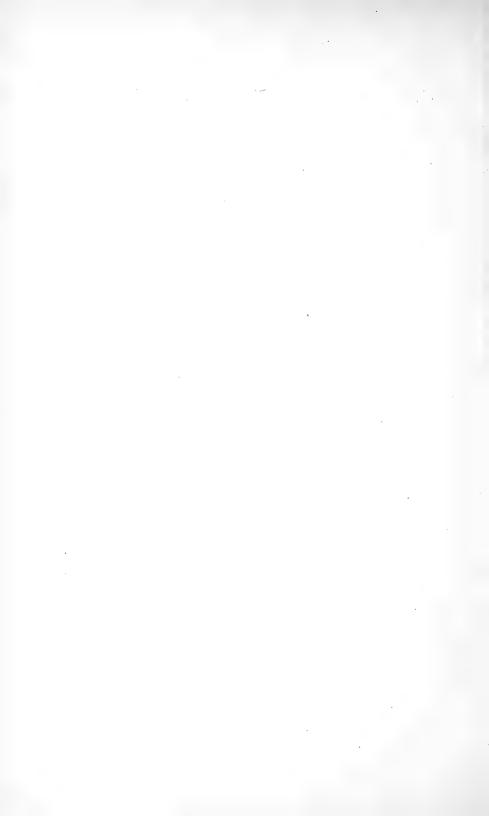
Lower Guinea. Belgian Congo: Stanley Pool Distr.; Kitebe, Vanderyst, 4116! and without precise locality, Vanderyst, 3692 (partly)! Angola: Pungo Andongo; damp wooded meadows between Cordo and Quisondo, Welwitsch, 7411! and without precise locality, Welwitsch, 2844!

(Rendle) 18. S. seslerioides, Stapf. Perennial, tufted from a slender wiry sometimes branched rhizome, up to over 1 ft. high, quite glabrous; innovations extravaginal. Culms very slender, terete, erect or shortly ascending, 2-5-noded, simple or with 1-2 short leafy branches. if more than 2-noded, lower 3-4 internodes very short or short, the uppermost more than half the length of the culm, very long-exserted. Leaf-sheaths unequal, the lower 3 or 4 very firm, bladeless or early throwing off the blades, reddish or brownish, increasing upwards, from a few lin. to 2 in., more or less opened out and prominently keeled, with rounded or truncate (lower) to subacute tips, or more or less herbaceous and slightly compressed and keeled upwards, upper terete and tight, with or without a minute truncate shoulder at the mouth, not auriculate, striate; ligule a minute ciliolate rim; blades linear from an equally wide base, tapering in the uppermost leaves to an acute slender point, $1\frac{1}{4}$ -6 in. by $1\frac{1}{2}$ -2 lin., somewhat plump, convolute in bud, then more or less flat, green, smooth except at the upper margins, midrib very slender, primary nerves 2-3 on each side, obscure. False spike $\frac{2}{3}-1\frac{1}{2}$ in. by 3-4 lin., cylindric, compact; pedicels hardly over $\frac{1}{2}$ lin. long. Spikelets ovate-lanceolate to ovate-oblong in outline, symmetrical or slightly oblique, not gaping, subterete, not quite 2 lin. long, over \(\frac{3}{4} \) lin. in diam., pale olivegreen below, darker and tinged with brown or livid towards the tips, glabrous. Glumes stoutly nerved; lower ovate, obtuse or subobtuse, one-third to almost half the length of the spikelet, 5-nerved; upper obliquely oblong in profile, obtuse, 7-nerved. Lower floret of; valve very similar to the upper glume and of the same length, 9-nerved; valvule narrow, linear-oblong, threequarters the length of the valve; anthers over 1 lin. long. floret \mbeta , narrowly oblong, subacute, $1\frac{1}{4}$ lin. by $\frac{2}{5}$ lin., whitish, polished.—Panicum seslerioides, Rendle in Cat. Afr. Pl. Welw. ii. 174.

South Central. Belgian Congo: Katanga, Homblé, 19!

19. S. catumbensis Stapf. Perennial, from a slender woody





rhizome, emitting numerous wiry roots, up to 1 ft. high. slender, erect or shortly ascending, with 4-5 short more or less wiry internodes (1-1 in.) at the base, followed by 1 or 2 longer and a very long uppermost one, occupying half or more than half the culm (excluding the spike), simple or with a few erect leafy branches from the lower nodes, terete, glabrous, smooth. Leaf-sheaths tight, terete, exauriculate, hairy upwards or all over, prominently striate, the lowest often bladeless, acute, $\frac{1}{4}$ in, long, the uppermost over 6 in. long; ligules very short, truncate, minutely ciliolate; blades linear from an equally wide or very slightly rounded base, tapering to a somewhat hard point, the lower and uppermost very short, the intermediate up to 5 in. by 2 lin., rigid, flat, loosely hairy (hairs sometimes rather long and very fine), rough above and along the margins, midrib very slender, prominent and whitish below, primary lateral nerves moderately slender, and slightly prominent below, or obscure. False spike erect on a more or less exserted peduncle, $\frac{1}{3}$ in. by up to $2\frac{1}{2}$ or $3\frac{1}{2}$ lin., lobed or interrupted, sometimes reduced to a succession of appressed 2-3-spiculate racemes and (upwards) solitary spikelets; pedicels rather stouter than usual in this genus, up to $1\frac{1}{2}$ lin. long, minutely scaberulous with discoid tips. Spikelets lanceolate-oblong, acute, temporarily slightly gaping, 2-2½ lin. long, yellowish-green, glabrous. Glumes ribbed; lower broad-ovate, subacute to obtuse in dorsal view, two-thirds the length of the spikelet, 7-9-nerved; upper ovate-oblong, with (when flattened out) subobtuse subhyaline tips, 9-nerved. Lower floret A or barren: valve very similar to and of the same or almost the same length as the upper glume, 9-nerved; valvule lanceolate-acute, much shorter than the valve with flaps evanescent upwards; anthers (if present) up to almost 1½ lin. long, whitish. Upper floret \(\noting\), oblong, acute, $1-1\frac{1}{4}$ lin. by $\frac{2}{5}$ lin., white, polished; anthers $1\frac{1}{4}$ lin. long; plumose stigmas up to 1 lin. long, long-feathery.—Panicum catumbense, Rendle in Cat. Afr. Pl. Welw. ii. 175.

Lower Guinea. Angola: Benguella; Andrade Corvo Mountains, 4400 ft., Wellmann, 1806! Huilla; pastures near Catumba, Welwitsch, 2689!

20. S. albida, Stapf. Perennial, from a very slender rhizome, up to over 2 ft. high. Culms erect or suberect, with a slender and hard base, which comprises 3-4 upwards increasing internodes $(\frac{1}{4}-1\frac{1}{2}$ in. long), above it 2-noded, very slender with 1 or 2 long leafy erect branches, the internode above the branching node compressed, otherwise terete, uppermost internode but one up to 6 in. long, the following (peduncle) up to over 1 ft. long, all quite glabrous, and smooth. Basal leaf-sheaths longer than or as long as the internodes, with rudimentary blades, brownish, the following herbaceous, somewhat loose and slipping off the culm, the uppermost tight, the longest 2-3 in. long, all without auricles or shoulders, finely keeled upwards and prominently striate, the lower very loosely hairy with fine

tubercle-based finally deciduous hairs, the others quite glabrous and smooth: ligule a fine membranous rim; blades linear-lanceolate (lower) to linear from a slightly narrowed base, tapering to a subcallous point, 2 in. by 3 lin. (lower) to 5 by 2 lin., flat or more or less folded or convolute upwards, green, loosely hairy on both sides with the hairs deciduous leaving small tubercles behind, margins scaberulous, midrib very slender, whitish and prominent below, primary lateral nerves 2-3 on each side, distinct below. False spike erect on a long-exserted peduncle, less than 1 in, by over 3 lin., rather loose: axis very slender; pedicels in small clusters or solitary from the axis, very short, somewhat stout, smooth with discoid tips. ovate-oblong, mostly slightly oblique, acute to subobtuse, 2 lin. by 7 lin., quite glabrous and smooth, whitish. Glumes firmly membranous, nervation evanescent downwards or altogether obscure; lower broad-ovate from a clasping base, obtuse, over half the length of the spikelet; upper very concave, with a back more curved than that of the lower floret, 9-1-nerved. Lower floret barren: valve very similar to the upper glume and of equal length, but the tip more obtuse when flattened out, 9-nerved with a marked "window" on each side at the base; valvule narrow, half the length of the valve, Upper floret \mbeta , oblong, obtuse, $1\frac{1}{4}$ lin. by $\frac{1}{2}$ lin., whitish, narrow. polished.

South Central. Belgian Congo: Katanga; dry woods near Elisabethville, Homblé, 71!

21. S. curvata, Chase in Proc. Biol. Soc. Wash. xxi. 8. Perennial, from a very slender early disintegrating rhizome, 1 to several ft. high. Culms very slender, weak, geniculately ascending from an often decumbent base, branched below, the upright parts 4-7-noded. terete, quite glabrous and smooth, internodes mostly exserted. sheaths rather tight, the lowest at length drying and breaking up, all quite glabrous and smooth or finely ciliolate along the outer margin, striate; ligule reduced to a very obscure minutely ciliolate rim; blades lanceolate-linear to linear from a shortly constricted base, tapering to an acute point, 2 to over 3 in. by 2-3½ lin., flat, thin, glabrous and smooth except along the finely scaberulous margins; midrib very fine, somewhat prominent below, primary lateral nerves 2-3 on each side, faint. Panicle erect, at length mostly long-exserted, ovate to ovate-oblong in outline when open, $1\frac{1}{2}$ - $4\frac{1}{2}$ in. long, divided to the third or sometimes fourth degree; common axis slender, striate to subangular, like all its divisions more or less wavy, terete and smooth, lowest internodes from over $1-\frac{1}{2}$ in. long, the upper relatively numerous and short; primary branches solitary, rarely approximate in pairs, subcapillary to capillary, divided from the base, the lowest up to half the length of the panicle, often spreading at angles of 50°-90°; secondary branchlets forming more or less secund simple or downwards compound loose racemes of 2-7



Thyridachne C.E. Hubbard, Kew Bull 1949: (363. 1949 1 species: T. tisserantie C.E. Hubbard. French Equatorial Africa: Ubangi-Chari; Onaka (Waka) District -- in pool on laterite, nov. 13, 1924. C. Tisserant 17/2. (Heil G. le Teshi). Glume II and sterile lemma in. durate, fertile lemma slightly less indurate. agnatic, 1 m. tall, shongy; blades linear obtuse, subrigid; inflorescence dense, 10-16 cm × 2.5-3.5 cm., rachis flexuous, pedictle Curved, 1-3 mm. long; spekelets 3-32 mms, Glumas smooth, 1st 0.5-0.7 mm; stende lemma with seti form alia on the back toward apex; fertile lemma and palea glabrous.

spikelets; pedicels \(\frac{1}{2}\)-1 lin. long, with minutely but distinctly discoid tips. Spikelets very obliquely oblong, gibbous and soon gaping, up to over $1\frac{1}{4}$ lin. long, green, glabrous and smooth. Glumes very dissimilar; lower reduced to a minute ovate faintly 3-1-nerved thin scale: upper obliquely ovate-lanceolate and acute in profile. ovate in dorsal view, conspicuously gibbous below, as long as the spikelet, herbaceous-membranous, prominently 9-11-nerved. Lower floret \mathcal{A} : valve sublinear in profile, oblong in dorsal view, as long as the upper glume and of the same substance, but 5-nerved; valvule linear, hyaline, 2-nerved, shorter than the valve, with very narrow flaps. Upper floret &, elliptic-oblong in outline, obtuse, dorsally convex (the curvature much broader than high), up to \(\frac{3}{4}\) lin. long, pale honeycoloured, polished; valve and valvule thinly crustaceous, the former very narrowly involute, obscurely 5-nerved, the latter with narrow downwards widening flaps; anthers $\frac{1}{3}$ lin. long. Grain broadelliptic, almost plano-convex, $\frac{2}{5}$ lin. by $\frac{1}{5}$ lin.; embryo not quite half the length of the grain; hilum small, punctiform.—Panicum curvatum, Linn. Syst. Nat. ed. xii. 732; Kunth, Enum. i. 87; Nees, Fl. Afr. Austr. 50 (excl. syn.); Steud. Syn. Pl. Glum. i. 67; Durand & Schinz, Consp. Fl. Afr. v. 745; K. Schum. in Engl. Pfl. Ost-Afr. C. 103; Hook. f. Fl. Brit. Ind. vii. 42; Stapf in Dyer, Fl. Cap. vii. 414; Wood, Natal Pl. t. 475 (bad). *P. curvatum*, var. tenellum, Durand & Schinz, l.c. (excl. syn. Roxb. & Kunth). *P. coryophorum*, Kunth, Rév. Gram. i. t. 107, and Enum. i. 88; Steud. l.c. 67; Durand & Schinz, l.c. 744.

Nile Land. British East Africa: in sandy plains in the Sabake valley,

Mozambique Distr. Zanzibar, Last! Taylor! German East Africa: Tanga, Sacleux, 2572! Kilimanjaro, Maurui, Volkens, 2369! Usambara; on cultivated land near Muoa, Holst, 3119! Rovuma Bay, Kirk!

Also in Natal, the islands of the Western Indian Ocean and Southern India. and Ceylon.

Imperfectly known species.

not Sweet 1788 22. Panicum (§ Gomphopanicum) rigens, Mez in Engl. Jahrb. xxxiv. 141. Perennial, stoloniferous, over 3 ft. high. Culms erect. stout, almost simple, terete, glabrous and smooth. Leaf-sheaths slightly keeled upwards, glabrous and smooth, produced at the mouth into large triangular auricles; ligules adnate to the auricles, glabrous; blades linear from an equally wide base, gradually tapering to an acute point up to 14 in. by $2\frac{1}{2}$ lin., erect, involute when dry, quite glabrous, margins almost smooth, midrib stout. False spike cylindric, dense, over 3 in. by 31 lin.; axis stout, straight, multiangular; pedicels short to very short, stout, glabrous and smooth. Spikelets conical, 2 lin. by $\frac{7}{8}$ lin., terete, erect or obliquely erect, glabrous or sparingly hairy, hairs long. Lower glume broadly rotundate-ovate, half the length of the spikelet, 5-nerved; upper

ovate, subacute, very concave, rigid, 9-nerved. Lower floret barren: valve like the upper glume and of about equal length but obtuse, 9-nerved; valvule 0. Upper floret much shorter than the lower, obtuse, almost white, polished; the tip of the valve slightly incurved.

Upper Guinea. Togo: Sokode-Basari, Kersting, 595.

This species seems to come very near to *S. auriculata*, but to differ in the presence of stolons, stout culms, very large auricles (quam maxime triangulatim auriculigeris), very long blades and spikes with a stout axis and stout pedicels.

75. SETARIA, P. Beauv. Agrost. 51, t. xiii. fig. iii.

Spikelets oblong to ovate in outline in dorsal view, very convex on the back, flattened or slightly depressed in front, hence oblique in profile, falling entire from the pedicels, subtended by 1 to many persistent bristles (modified branchlets), gathered into contracted spike-like or more or less open panicles; lower floret of or barren and sometimes reduced to its valve; upper floret \(\). branous, unequal, the lower generally much smaller, ovate from a clasping base, mostly 3-5- (rarely 1- or 7-) nerved; upper similar to the lower but longer or corresponding in size and outline to the spikelets (in dorsal view), 5-7- (rarely 3- or 9-) nerved. Lower floret usually equalling the upper floret or slightly exceeding it: valve corresponding in size and outline to the spikelet (in front view). membranous, 5-, rarely 7-nerved, flat or depressed longitudinally; valvule if fully developed almost as long as the valve, oblong to elliptic-oblong, acute, sharply keeled or the keels marginate or narrowly winged. Upper floret: valve very convex on the back or boat-shaped, more or less apiculate, crustaceous, very finely pitted or more often transversely rugose; valvule subequal to the valve and similar in substance, embraced all along by the involute margins of the latter up to its more or less prominent keels. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted upwards. Grain tightly enclosed by the hardened valve and valvule, oblong or ellipsoid in outline; hilum basal, punctiform or orbicular; scutellum about half the length of the grain.—Perennials or annuals of various habit; ligule usually reduced to a ciliate rim; panicle mostly cylindric with the solitary or clustered spikelets on very stunted branches which are more or less produced into bristles beyond the spikelets or divided into a one-sided involucre of bristles, or the panicle more or less open with elongated branches and more distant spikelets, often with or without subtending bristles in the same inflorescence.

Species up to 100 in the warm regions of the world, a few common as weeds in the more temperate parts.

The reasons for the retention for this genus of the name Setaria, in preference to the name Chætochloa employed by Lamson-Scribner, are explained in detail in the Kew Bulletin for 1920.

